ROPES & GRAY
225 FRANKLIN STREET
BOSTON, MASSACHUSETTS 02110

CABLE ADDRESS "ROPGRALOR"
TELEX NUMBER 940519
TELECOPY (617) 423-7841

(617) 423-6100

IN WASHINGTON:
1001 TWENTY-SECOND STREET, N.W.
WASHINGTON, D.C. 20037
(202) 429-1600

January 15, 1985

Merrill Hohman, Director
Waste Management Division
United States Environmental Protection Agency
Room 1903
JFK Federal Building
Boston, Massachusetts 02203

Dear Mr. Hohman:

Enclosed herewith are the comments of Aerovox Incorporated of New Bedford, Massachusetts and RTE Corporation of Waukesha, Wisconsin on the "Draft Feasibility Study of Remedial Action Alternatives, Acushnet River Estuary Above Coggeshall Street Bridge, New Bedford Site, Bristol County, Massachusetts" prepared by NUS Corporation and dated August 1984 (with Addendum dated September 1984). A review of the NUS draft Feasibility Study reveals not only that the conclusions of the report are factually unsupportable, but also that the fast-track approach adopted by the Agency, of which the NUS report is an integral part, violates CERCLA and the National Contingency Plan. Moreover, there is a substantial likelihood that implementation of the remedial alternatives proposed in the draft Feasibility Study will result in the waste of tens of millions of dollars implementing remediation in the Acushnet River Estuary that, at best, will be ineffectual and, at worst, will exacerbate the situation not only in the Estuary but in New Bedford Harbor as well. PCBs are not acutely toxic, and there is and has been no demonstrable effect on public health from the presence of PCBs in the Estuary.

We urge the Agency to give serious consideration to these comments and to abandon the fast-track approach it is taking with respect to the Estuary. There is no justification for the expenditure of enormous sums of money

to effect remediation that may prove, once the necessary testing and data collection have been completed, to be neither cost effective nor environmentally sound.

Very truly yours,

Paul B. Galvani

Paul B.Galvani

PBG/RBA/asc

COMMENTS OF AEROVOX INCORPORATED AND RTE CORPORATION ON "DRAFT FEASIBILITY STUDY OF REMEDIAL ACTION ALTERNATIVES, ACUSHNET RIVER ESTUARY ABOVE COGGESHALL STREET BRIDGE, NEW BEDFORD SITE, BRISTOL COUNTY, MASSACHUSETTS" SUBMITTED BY NUS CORPORATION DATED AUGUST 1984 (WITH ADDENDUM DATED SEPTEMBER 1984)

January 15, 1985

INTRODUCTION

Aerovox Incorporated ("Aerovox") and RTE Corporation ("RTE") respectfully submit the following comments on the "Draft Feasibilty Study of Remedial Action Alternatives, Acushnet River Estuary Above Coggeshall Street Bridge, New Bedford Site, Bristol County, Massachusetts" prepared by NUS Corporation and dated August 1984 (with Addendum dated September 1984) (the "draft FS"). While Aerovox and RTE make this submission as a part of their continuing effort to cooperate with the Agency in this matter, this submission should in no way be construed as an admission of liability by, or in any way operate to prejudice the rights of, Aerovox and RTE. Aerovox and RTE continue to insist upon their rights to due process in connection with any attempt to hold them responsible for, or to assess them the costs of, any removal or remedial action undertaken in the upper Acushnet River Estuary or elsewhere. Aerovox and RTE do not hereby abandon their claim of right to an adjudicatory hearing or any other attendant rights to due process.

Part I of these comments consists of an analysis of the legal issues raised by the fast track approach taken by the Agency towards reaching a final decision on remediation in the upper Estuary prior to completion of the ongoing remedial investigation. The conclusion is that the Agency's

fast track approach, of which the draft FS is an integral part, violates the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA") and the National Contingency Plan ("NCP") promulgated under CERCLA. This legal discussion, of necessity, borrows from the technical critique of the draft FS contained in Part II of these comments.

There are certain statutory and regulatory requirements other than those set forth in CERCLA and the NCP with which the Agency must comply. Principal among these are the requirements of the National Enviromental Policy Act (NEPA) of 1969, 42 U.S.C.§§ 4231 et seq., and the regulations promulgated thereunder. See, e.g., 40 C.F.R. §§ 1503.1-1503.4. An extensive discussion of these requirements is contained in the comments on the draft FS submitted by Cornell-Dubilier Electronics Co., Inc. ("CDE") to which the Agency is respectfully referred and which is incorporated herein by reference.

Part II of these comments consist of technical comments and a critique of the draft FS as well as a report by David D. Rutstein, M.D., of The Harvard Medical School Department of Preventive Medicine and Clinical Epidemiology. Dr. Rutstein's report summarizes the scientific evidence as to the hazards to humans of exposure to PCBs in general and in the New Bedford Harbor area.

Aerovox and RTE encourage the Agency to give serious consideration to the legal and technical comments and analyses contained herein, although the Agency's adversarial posture toward Aerovox and RTE in the pending Superfund litigation undoubtedly makes it impossible for the Agency to give unbiased consideration to the comments contained herein. Nevertheless, we remind the Agency of its obligation to take the most environmentally sound and cost efficient approach towards the present situation in the Acushnet River Estuary and New Bedford Harbor.

The Agency's present course, as foreshadowed in the draft FS, is destined to lead to the expenditure of tens of millions of dollars for the implementation of a remedial action based upon data, risk assessment and consideration of remedial alternatives that are inadequate and incomplete. This approach is more likely to compound than resolve the problem. We urge the Agency to abandon its fast-track approach toward remediation in the upper Acushnet River Estuary inasmuch as it can only cost excessive amounts of money inconsistent with the National Contingency Plan and may exacerbate the current situation. In any event, given all the facts, no action remains the only intelligent and justifiable alternative.

PART I

LEGAL ANALYSIS

I. INTRODUCTION

The draft FS prepared by NUS was not designed to, and does not, provide the technical basis required for reaching a final decision on the appropriate remedial response in the Acushnet River Estuary. Were it not for the EPA's "fast track" approach toward determining remedial action for the Estuary, this technical information, or at least a significant portion thereof, would eventually be provided as a result of the ongoing remedial investigation of PCB-contamination at the New Bedford site. By commencing a feasibility study and selecting a clean-up remedy prior to the completion of the remedial investigation, EPA is violating CERCLA as well as the NCP.

II. THE DRAFT FEASIBILITY STUDY FAILS TO PROVIDE AN ADEQUATE BASIS UPON WHICH EPA CAN MAKE A REASONED DECISION REGARDING FINAL REMEDIAL ACTION

CERCLA[1] authorizes EPA[2] to undertake response measures to prevent or minimize release of hazardous substances into the environment that cause a present or potential

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[1] Publ. L. No. 96-510, 94 Stat. 2767, codified at 42 U.S.C. §§ 9601-9657.

[2] Section 115 of CERCLA authorizes the President to delegate responsibility for administering the Act, 42 U.S.C. § 9615. By means of Executive Order 12316, the administration of CERCLA was delegated to the U.S. Environmental Protection Agency. 46 Fed. Reg. 9901 (Jan. 30, 1981).

substantial endangerment to public health or welfare or the environment. 42 U.S.C. § 9602(a). EPA's response may include both short-term removal actions or longer-term remedial actions consistent with the NCP.[3] CERCLA defines "removal actions" as primarily short-term limited responses that may be necessary to prevent, minimize, or mitigate damage to public health or welfare or the environment.[4] "Remedial actions" are primarily longer-term responses "consistent with a permanent remedy."[5]

A. The NCP Governs the Selection of a Remedial Action

CERCLA itself does not stipulate how appropriate remedial response is to be chosen. Section 104 provides that EPA, as the President's delegate, must act "to remove or arrange for the removal of, and provide for remedial action relating to such hazardous substance, pollutant or contaminant, consistent with the national contingency plan . . . to protect the public health and welfare or the

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[3] The National Contingency Plan was promulgated July 16, 1982. 47 Fed. Reg. 31180 (Jul. 16, 1982), as amended; 40 C.F.R. Part 300.

[4] Examples given in CERCLA of removal actions include security fencing, provision of alternate water supplies, and temporary evacuations of threatened citizens. 42 U.S.C. § 9601(23).

[5] This term encompasses such activities as storage and confinement of hazardous substances by means of dikes and clay covered trenches, and neutralization of active compounds and dredging. 42 U.S.C. § 9601(24).

environment. . . ." 42 U.S.C. § 9604(a)(1)(B) (emphasis added). Section 105 directs EPA to revise the NCP to establish procedures and standards for responding to releases of hazardous substances, pollutants, and contaminants consistent with the new Superfund Law.[6] 42 U.S.C. § 9605. The NCP promulgated by EPA in 1982 thus governs remedial actions taken under the Act. See 47 Fed. Reg. 31180 (Jul. 16, 1982), 40 C.F.R. Part 300.

The legislative history of CERCLA reveals that Congress intended that the NCP establish procedures to ensure that the nature of the hazardous releases, their actual effects on the ecosystem and the relative benefits of alternative remedial measures would be evaluated in order to guarantee that the measures chosen to protect public health and welfare and the environment would be cost-effective and environmentally sound.[7] In promulgating the NCP, EPA included appropriate procedures to comply with Congress' intent. The NCP establishes seven phases for discovering and assessing hazards of contamination to the public and the

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[6] The National Contingency Plan was first promulgated pursuant to section 311 of the Federal Water Pollution Control Act, 1972, as amended by the Clean Water Act of 1977, codified at 33 U.S.C. § 466.

[7] Senate Comm. on Environ. and Public Works, 1 Legislative History of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, at 689, 690 (Comm. Print 1983).

environment, determining whether there is a need for remedial action, and assessing the technical and economic feasibility of alternative remedial responses. 40 C.F.R. Part 300, Subpart F.

The NCP clearly contemplates that, unless hazardous substances require immediate removal, the Agency will complete a remedial investigation of a site before undertaking a feasibility study of alternative remedial responses. 40 C.F.R. § 300.64. Under the NCP, the remedial investigation is designed "to determine the nature and extent of the problem presented by the release," and should include "sampling and monitoring, as necessary, and the gathering of sufficient information to determine the necessity for and proposed extent of remedial action." 40 C.F.R. § 300.68(f). Only after such information is gathered does the NCP provide for the development and initial screening of remedial alternatives. Id. at § 300.68(g) and (h).[8] EPA, in "fast-tracking" its decision on the remedial action to be taken in the Acushnet River

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[8] Indeed, former EPA Administrator Ruckelshaus testified before a subcommittee of the U.S. House of Representatives Committee on Energy and Commerce that the "completion of the RI [remedial investigation] is the sine qua non for either private party or Fund financed remedial action." Statement of former Administrator Ruckelshaus, U.S. EPA, before the Subcommittee on Commerce, Transportation and Tourism, Committee on Energy & Commerce, U.S. House of Representatives, March 15, 1984.

Estuary, has omitted this crucial, information-gathering step and has proceeded instead to develop and screen alternative remedial actions based upon assumptions, rather than facts, about the nature and extent of contamination -- the very issue the remedial investigation is designed to address.

The present fast-track approach is not a mere procedural defect. As demonstrated fully in the technical comments submitted herein, the draft FS is fundamentally flawed as a basis for a decision on remedial action for the Estuary. The document does not provide information essential to evaluate (1) the location within the Estuary of the hazardous substances in issue, (2) their actual effects on the ecosystem, and (3) the risks associated with their presence in that system. Such information is essential to determining the "nature and extent of the problem" under section 300.68(f), a prerequisite to developing remedial alternatives under sections 300.68(g) and (h) of the NCP. Until such information is gathered, any choice of a remedial program for the Estuary would likely result in a program that is neither cost-effective nor well-suited to the environmental and public health concerns expressed in the draft FS, both explicit requirements of the NCP.

B. There Is No Evidence That The Acushnet *River Estuary Poses An Immediate And* Significant Risk And Therefore EPA Cannot Forego Conducting A Remedial Investigation In Its Efforts To "Fast-Track" The Remedial Decision

The seven phase plan set forth in the NCP establishes an evaluation scheme based on the type of release under consideration. 40 C.F.R. Part 300, Subpart F. EPA has stated that "[t]he basic premise supporting the evaluation scheme is that the less imminent the threat, the greater the time available for the evaluation process." 47 Fed. Reg. 31181. The NCP recognizes that in certain clearly-delineated situations, the preliminary assessment of a site may reveal that expedited action is necessary to remove an "immediate and significant risk of harm to human life or health or to the environment." 40 C.F.R. § 300.65 Immediate removal is appropriate to address an immediate and significant risk of harm to human life or health emanating from (a) human, animal or food chain exposure to acutely toxic substances, (b) contamination of a drinking water supply, (c) fire and/or explosion, or (d) similarly acute situations. Id.

The draft FS concludes that the Estuary presents an "immediate risk" to the environment and the public health, but provides no support for that conclusion. The draft FS is inconclusive as to any basis for characterizing the present situation in the Estuary, a situation which has

existed for decades, as presenting an immediate risk requiring immediate removal. Moreover, as is made clear in the report of David D. Rutstein, M.D., of Harvard Medical School, attached hereto, PCBs are not acutely toxic and there is no evidence of a public health threat from PCBs to the New Bedford populace.

As more fully set forth in the accompanying technical comments, the draft FS limits its consideration of the risks, if any, presented in and by the Estuary to a general discussion about routes of PCB transport and atmospheric environments. Essentially, the document includes no technical basis for judging, at a minimum, the exposure routes, the population affected by the transported chemicals, and the nature and duration of the effects. Indeed, the EPA has commissioned further studies (among them, those of Battelle and the Centers for Disease Control) for the purpose of providing just this sort of required data.[9]

Not only does the draft FS fail to establish that an immediate risk exists, it contains information that argues forcefully against such a conclusion. For example, the

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[9] It should be noted that EPA recently published proposed guidelines for conducting exposure assessments. 49 Fed. Reg. 46204 (Nov. 23, 1984). Judged by EPA's own standards, the so-called "risk assessment" in the draft FS is woefully inadequate.

draft FS notes that ambient air PCB levels have declined over the last few years. While there are no national levels for non-occupational exposure to ambient air PCBs, the levels of PCBs downwind from the Estuary fall within the acceptable range set by municipalities such as Philadelphia and New York. Moreover, there is evidence that PCBs in the Estuary are being buried by natural sedimentation and that body burdens of PCBs in lobsters in the outer Harbor are declining with time. Finally, the very timetable established by EPA, whereby remedial activities would not be undertaken in the Estuary until Spring 1985 at the earliest, underscores the fact that no emergency situation exists so as to excuse the completion of the remedial investigation in the present case.[10]

As the Agency stated in the preamble to the NCP, "(w)here the threat is immediate, evaluation actions are limited in order that rapid response can be taken. As the threats become less immediate, the Plan allows more extensive evaluation." 47 Fed. Reg. 31181 (Jul. 16, 1982). Such is the situation that exists in the Estuary. Because EPA is "fast-tracking" a remedial decision where no

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[10] Given the lack of evidence that an immediate risk of harm exists in the Estuary, a finding of "imminent and substantial endangerment" under section 106 of the Act would not be supportable. See 42 U.S.C. 9606.

emergency exists, its actions violate the provisions of CERCLA and NCP.

C. The Remedial Measures Under Consideration Do Not Constitute "Initial Remedial Measures"

The NCP provides that "initial remedial measures" may commence before the final selection of an appropriate remedial action "if such measures are determined to be feasible and necessary to limit exposure or threat of exposure to a significant health or environmental hazard and if such measures are cost-effective." 40 C.F.R. 300.68(e)(1). The NCP contains a list of factors to be used in determining whether to take initial remedial measures and gives examples of measures that might be appropriate, such as signs, fences and dikes. None of the factors present in the Estuary, and the alternative remedies being considered in the draft FS are of a totally different nature and magnitude from those initial remedial measures prescribed in the NCP. These alternatives set forth in the draft FS constitute the ultimate remedies, not mere "initial remedial measures."[11]

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[11] EPA has not characterized the alternatives proposed in the draft FS as initial remedial alternatives, and indeed has taken steps to disassociate itself from such a characterization. The draft Remedial Action Master Plan ("RAMP") released for public comment in 1983 asserted that the PCB "hot spots" in the upper area of the Acushnet River Estuary would be "the focus of initial remedial measures over the next 6-12 months."

D. The Draft FS Is Not A Substitute For A Remedial Investigation

Beyond its failure to establish any "immediate risk" presented in the upper Estuary, the fundamental weakness in the draft FS is its lack of data on key points necessary to evaluate the type and extent of remedial action that should be taken in the Estuary. This "data gap" is directly attributable to EPA's commitment to develop a remedial action plan for the Estuary on a "fast track" basis.

In determining the appropriate extent of source control remedial action, the NCP sets forth the criteria that "should be assessed in determining whether and what type of source control remedial actions should be considered." 40 C.F.R. § 300.68(e)(2). It lists the following points of inquiry:

- The extent to which substances pose a danger to public health, welfare or the environment, including such factors as population at risk, amount and form of the substance present, hazardous properties of the substance, hydrological factors, and climate;

- The extent to which substances have migrated or are contained by either natural or manmade barriers;

Section 1.2, final paragraph. Criticism of EPA's characterization of the costly dredging program anticipated for the Estuary as an "initial remedial measure" presumably resulted in the change effectuated. The final RAMP states that "[t]hese PCB hot spots will be the focus of a feasibility study over the next 6-12 months." RAMP at 5, § 1.2 (final paragraph) (emphasis added).

- The experience and approaches used by government to address similar releases in other areas;
- *Environmental effects and welfare* concerns.

40 C.F.R. §§ 300.68(e)(i)-(iv).

The Workplan for the New Bedford site and the RAMP both recognize that answers to these inquiries were essential to an understanding of the dynamics of the Harbor and the behavior of the contaminated sediments and their uptake in the foodchain. Primary importance in these documents is also placed on studies to be undertaken as part of the remedial investigation. These include studies to determine pathways of human and environmental exposure through uptake of PCBs by benthic organisms and finfish and the development of a foodchain model for extrapolating between ambient water concentrations of PCBs and their accumulation ultimately in edible animal tissues. Monitoring of the natural capping of sediments on the river bottom and the harbor is also *emphasized as an important phenomenon to be observed before* alternative remedial responses are weighed. A study is to be undertaken under the auspicies of the Centers for Disease Control to determine the public health effects, if any, of PCBs in the environment on the populace of New Bedford. These studies, however, have not been completed. EPA cannot make an informed decision on a remedial program for the Estuary before such data are available.

The inadequacy of the draft FS's analysis of available and relative benefits of the proposed remedial alternatives provides a further reason for abandoning the fast-track approach. As set forth in detail in the accompanying technical comments, there are a number of technical oversights and omissions in the draft FS that have serious implications regarding the effectiveness of the proposed remedial actions and their environmental and public health effects.

For example, there is inadequate consideration of the effects of dredging contaminated sediments on the ecosystem and no comparison at all with EPA's prior dredging experience in the Hudson River and Waukegan Harbor.[12] The draft FS fails adequately to address the special problems from a water treatment standpoint due to potentially large fraction of PCBs that are likely to be released from sediments during dredging. Nor does the document consider in sufficient detail whether the proposals it does put forth, such as silt curtains, would be effective in retaining the material released to the water column during dredging. Nor is the likelihood of recontamination considered. Little if any consideration is given to

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[12] This failure to consider the limited experience EPA already has with PCB removal violates the express directions of the NCP, see 40 C.F.R. §§ 300.66(a)(2)(iv) and Sections 300.68(a), (e), (f) and (g).

contamination from heavy metals. No attempt is made to identify discreet hot spots in the Estuary. Instead, the entire Estuary is considered as one "hot spot" -- 200 acres to be dredged to a depth of 3 feet.

Errors or oversights of the type documented in the accompanying technical comments could lead to substantial cost-overruns and could have unintended harmful effects on the environment and public health. Particularly where, as in the instant case, there is no imminent environmental hazard or risk to the public health, there is no justification for EPA's proposed rush into enormously risky and expensive engineering projects, the benefits of which have not been demonstrated.

CONCLUSION

The NCP requires a remedial investigation to determine the nature and extent of the problem to be addressed by the remedial program, and therefore a remedial investigation constitutes a necessary predicate to the development of remedial alternatives. As originally envisioned by the EPA, the decision to "fast-track" a remedial action plan for the Estuary was to "limit only the time element, not the content, of the remedial process." RAMP at 7. The draft FS, however, fails to fulfill this commitment of EPA or, more importantly, the requirements of the NCP. The document was not designed to provide, nor does it provide, the most essential information for making a remedial action decision.

EPA's fast-track approach is so extreme that only an immediate and significant risk of harm could justify proceeding in the manner proposed. Yet, the nature of PCBs in the environment -- both generically, as well as in the Acushnet River specifically -- and EPA's actions to date demonstrate that no such immediate risk exists. Moreover, the NCP requires, and common sense dictates, that the development of remedial alternatives be predicated upon sufficient information about the problem to ensure that the remedial program ultimately decided upon will be both cost-effective and environmentally sound.

Reliance upon the draft FS to "fast track" any remedial decision for the Estuary could have a number of serious and irreversible consequences. By refusing to collect or to await the data necessary to develop the most cost-effective and feasible plan, EPA risks not getting it right the first time, a consequence that CERCLA and the NCP were designed to prevent. EPA's decision to proceed with its "fast-track" approach can only result in an unsupportable administrative decision, made in contravention of the requirements of CERCLA and the NCP.

PART II

TECHNICAL COMMENTS

A. GENERAL COMMENTS

The National Oil and Hazardous Substances Pollution Contingency Plan (the "NCP") at 40 C.F.R. 300.68(i) requires a "detailed analysis" of potential remedial action alternatives. In general, the draft NUS Feasibility Study (the "draft FS") does not include sufficient detail to allow independent evaluations of the alternatives. There are several areas where data are missing, including initial and secondary screening criteria, engineering design information, engineering costing information, detailed description of the effects of implementation of the alternatives, lack of quantification of risk, and a general lack of documentation.

1. The draft FS was initiated and prepared under a basic misconception that remediation of the upper Estuary, and specifically so-called "hot spots" of PCBs, is an urgent need. The draft FS states that the PCBs pose an immediate risk to public health, welfare and the environment and that is given as the justification for a "fast track" approach to remediation in the upper Estuary. Immediate risk is not documented in either the draft FS or in any of the other volumes of literature that have been generated concerning

the Acushnet River Estuary. The reasons behind the urgency are not elucidated in the draft FS.

Several site-specific factors operate to reduce the degree of urgency concerning any contemplated remediation, including:

a. The present conditions in the upper Estuary are the result of many decades of industrial and municipal discharges of various pollutants. The sense of urgency that would attach to a sudden spill of pollutants is lacking.

b. The principal contaminants addressed in the report, toxic metals and PCBs, are known to be relatively insoluble in water and to have an affinity for fine-grained sediments that results in limited pollutant mobility in the environment. The alleged net movement of contaminants from the area north of Coggeshall Street to the lower portions of the Estuary has not been proved.

c. The criteria established by EPA in NCP for determining the need for immediate removal actions at a given site (40 C.F.R. § 300.65(a)) are not satisfied in the upper Estuary study area. PCBs are not an acutely toxic substance. Nothing in the draft FS establishes that any PCBs present in the upper Estuary pose an immediate risk to human health through the food chain or otherwise.

d. Air monitoring data cited in the draft FS show a 70% decrease in airborne PCB levels over the 1978 to 1982 period in areas downwind of the Estuary. Also, alleged causal relationships between PCBs in sediments and mudflats and PCBs in air have not been established, and thus the effectiveness of remedial alternatives in reducing airborne PCB levels cannot be evaluated.

e. There is little or no use of the shoreline and mudflats of the upper Estuary for recreational purposes, so that direct contact exposure is minimal in the study area. The potential for inadvertent direct contact with sediments containing toxic metals and PCBs can be further reduced through cost-effective access control measures such as warning signs and fencing.

2. The draft FS presents only a very generalized description of the distribution of PCBs and toxic metals in the sediments of the upper Estuary. As a result, almost the entire area north of Coggeshall Street has been labelled as a "hot spot" and several remedial alternative evaluations have been based upon removal of 3 feet of sediment from the entire upper Estuary. There is a critical need for valid data on PCB and metal concentrations vs. depth throughout the upper Estuary, and on sediment physical properties, including grain-size distribution and settlement/suspension

properties, to be developed before any environmentally sound, cost-effective remedial plan can be formulated.

3. The validity of the existing data base for the study area is not established in the draft FS. There has been tremendous variability in sampling conditions and methods and analytical procedures used during the large number of independently conducted sampling efforts over the years. Furthermore, much of the existing data is biased toward high pollutant concentration areas, so that a representative characterization of the upper Estuary area cannot be made. Conclusions have been drawn by NUS on the basis of invalid and/or unrepresentative data on sediment base. The data are inadequate to support the NUS action level (i.e., removal of sediments throughout the upper Estuary to a depth of 3 feet) and do not allow meaningful cost-effectiveness analysis of alternative remedial plans.

4. The risk associated with likely contact or ingestion of PCBs has not been quantified in the draft FS. Current EPA policies require that the environmental fate and transport of hazardous substances or contaminants be identified. In addition, the toxicological properties and surrounding receptor populations or environments must also be identified. After consideration of the surrounding receptors, a risk assessment and impact evaluation should be conducted. None of this information is apparent in the draft FS. The risks to receptors surrounding the site must

be quantified in order for the decision for a fast track feasibility study to be justified.

Moreover, the draft FS includes a risk assessment in Section 3.3.3 in which every potential health risk category examined is judged to be either "no risk," "minimal risk," "some potential," "likely to be small" or "not assessed." Despite this assessment, the draft FS contains numerous statements about alleged substantial public health and environmental risks to be mitigated. It is our opinion that the draft FS has failed to establish any linkage between the upper Estuary and alleged public health impacts, and that NUS has biased its assessment of environmental impacts toward PCBs to the exclusion of impacts associated with toxic metals, sewage or other pollutants that may be present. The NUS risk assessment is severely lacking in quantitation of contaminant source areas; contaminant mobility and fate; exposure mechanisms; and health and environmental impacts. Ongoing EPA studies in the New Bedford Harbor area may eventually provide the kinds of data that would be needed to develop an evaluation of remedial options for the upper Estuary that truly considers existing, documented public health and environmental impacts, if any, as well as quantifiable benefits of remedial plans.

5. It appears that the draft FS was prepared with no information concerning the transport of PCBs through the water column or by adsorption onto sediments within the

Estuary. The important question of sediment transport and deposition within the upper Estuary is not addressed at all in the draft FS. Along with sediment chemical and physical properties, the transport data are needed to understand adequately the system and formulate appropriate cost-effective remedial plans. The existing sediment distribution patterns in the upper Estuary appear to have resulted in the natural covering of contaminated sediments with cleaner sediments in the past several years. This phenomenon has been disregarded by NUS

Also, in terms of remedial plans, the potentially substantial adverse effects of widespread disturbance of now-covered sediments have not been adequately evaluated. The resuspension of contaminated sediments during dredging, with subsequent transport out of the upper Estuary, has not been assessed by NUS. Although a sediment transport study is currently being conducted, the draft FS was generated before that study was completed. The better practice would have been to wait until the results of the sediment study have been documented and transport mechanisms of PCBs been identified. The draft FS recommends alternatives that may not be appropriate for implementation in light of unknown characteristics of PCB transport.

6. The draft FS, proceeding as it does on a "fast-track" basis without the benefit of the results to be provided from several ongoing studies prescribed by the

RAMP, reflects a less than comprehensive approach to upper Estuary remedial planning. NUS appears to have started with a preordained conclusion, recited various buzz words from the NCP (such as "immediate risks" and "cost effective") to support that conclusion, but ultimately lacked the data to support the conclusions it reached. Where data was needed but missing, NUS supplied assumptions and speculation. A truly cost-effective remedial plan for the upper Estuary cannot be designed without the results of the ongoing studies. Nor can the viability of the no-action alternative be dismissed without the data from such studies.

7. In addition to proceeding without the availability of many types of necessary data for the upper Estuary, the fast-track approach taken by the draft FS is inappropriate because it does not allow an areawide or "global" perspective to be used in evaluating potential problems and cost-effective solutions. For example, the NUS report does not address the potential problem of recontamination of the upper Estuary by pollutants transported into the upper Estuary by tidal flow or through existing point and non-point (including subsurface flow) discharges to the upper Estuary. There is no benefit to implementing remedial actions costing tens of millions of dollars, only to have the area recontaminated thereafter by the same or other pollutants.

8. The NCP also requires evaluation of alternative remedial actions on the basis of cost, engineering implementability and effect. The draft FS presents only bottom-line costs for each alternative and does not include any of the assumptions used in deriving the costs. Data on the engineering implementability of various alternatives are not presented in detail sufficient to allow independent evaluation. The design basis for various alternatives was not included in the draft FS. Each proposed remedial action alternative also has associated with it serious environmental consequences that may in some cases exceed the consequences resulting from PCB contamination of the sediments. Description of environmental impacts and suggested mitigation measures were not included in sufficient detail in the draft FS to allow independent evaluation.

9. In addition to the above-noted concerns, the draft FS and its Executive Summary contain several accusatory statements concerning the sources of the contamination problem. These types of statements are not relevant to a feasibility study and reflect a less-than-neutral approach in the preparation of the draft FS. In addition, no documentation is offered to support these accusatory statements.

10. The draft FS does not provide adequate citations and references to previous reports and data sources.

B. SPECIFIC COMMENTS

Section 1.0 Introduction

page 1-1, paragraph 2, line 11.

There is no documentation to support the statements that "extremely high levels of PCBs in these locations . . . pose an immediate risk to public health, public welfare and the environments . . .". There is also no basis presented for the statement that " . . . contaminants are migrating from this area." These two statements are used to support the fact that a fast track feasibility study was authorized but there is no quantitative data to show that such an immediate risk does exist.

1. Since the study area is not a spill-area, but in fact has received industrial and municipal discharges for many years, why is there an "immediate" risk to public health, etc.? There is no documentation in the NUS report that there are any existing "immediate risks" to public health.
2. What is the nature of the alleged "immediate" risk to public health, public welfare and the environment? PCBs are not an acutely toxic substance. There is no evidence of any threat to public health caused or threatened by the presence of PCBs in the Estuary.
3. What proof is there that contaminants are migrating from this area? During the past several years,

1. The sedimentation rate in the area has been estimated at 1.7 to 4 centimeters per year (0.7 to 1.5 inches per year) since 1966. Even using the low estimate for sedimentation since 1966, over 30 centimeters of sediment would have been deposited. This appears to provide some basis for assuming natural mitigation of PCB contamination and migration is occurring.

page 2-12.

1. There is no data to support the statement that overall flow and circulation patterns in the inner harbor are primarily forced by conditions in the outer harbor. In addition, the draft FS considers local sea breezes sufficient to resuspend sediments in the shallow waters of the Estuary. If this is the case, then every identified remedial action alternative would additionally suspend sediment and allow for the greater potential migration of PCBs adsorbed to the resuspended sediment into the outer harbor

page 2-15.

1. Unless a study is done over the entire Estuary, no general statement concerning hydraulic connection between surface water and ground water can be made.

page 2-17, paragraph 2, line 4.

contaminated sediments have been covered over naturally by clean sediments?

page 1-2.

1. The listed objectives do not take into consideration that the Estuary has already been closed to fishing for problems unrelated to PCB contamination. The "immediate risk to public health" is not quantified nor are "the impacts on acquatic and terrestrial organisms and resources within the upper harbor . . .". In addition, the respiratory inhalation of PCBs has not been quantified, and it is questioned whether this represents a realistic pathway for the migration of contaminants since PCBs exhibit such low vapor pressure.

page 1-2, paragraph 1, line 3 to 9.

1. What "immediate risk to public health" will be decreased by remediation of PCB hot-spot areas?
2. The phrase " . . .possibly other contaminants . . ." suggest that the data base for the study area is incomplete.
3. The public health threats alleged are later characterized in Section 3.3 as either "no risk", "minimal risk", "likely to be small" or are "not assessed" in the NUS report.

page 1-2, paragraph 2, line 9 to 14.

1. What are the alleged " . . .impacts on aquatic and terrestrial organisms and . . . on public health and welfare"?

page 1-2, paragraph 3, line 19 to 23.

1. The word "progressive" implies an ever-increasing rate of movement, which is unsubstantiated.

page 1-2, paragraph 4, line 3.

1. "Future risk" of what?

page 1-3.

1. There is no quantified justification for setting a target level for cleanup of one part per million (ppm). *There are precedents set at Waukegan* Harbor, Illinois and along the Hudson River in New York for cleanup action levels of 50 ppm. Given the potential for vertical attenuation of contamination within the harbor sediments, an action level of 1 ppm can result in significantly greater cost that an action level of 50 ppm.

page 1-3, paragraph 1, line 4.

1. The 50 ppm TSCA limit on PCBs is currently undergoing review at EPA under court order and may be changed.

page 1-3, paragraph 2, line 1.

1. Which study objectives would cleanup to a level of 50 ppm satisfy?

page 1-3, paragraph 3, line 1 to 8.

1. The selected target levels of 1, 10 and 50 ppm are arbitrarily selected, are based on a simplistic approach to setting cleanup objectives, and are not a realistic framework for evaluation of remedial alternatives. Note that the existing sediment data for the upper area are not sufficient to delineate areas with PCB concentrations of 1, 10 or 50 ppm.
2. Cleanup objectives for the study area should be established as a function of documented (not speculative) impacts, if any, on public health, public welfare and the environment.

page 1-4, paragraph 1, line 2 to 7.

1. The sediment data available for the study area do not support the statement that ". . .at least 80 percent of the study area contained sediment PCB concentrations in excess of 50 ppm . . ." This is a gross assessment at best and is not supported by the existing data base. Much of upper Estuary sediment has never been sampled.

page 1-4, paragraph 1, line 5 to 7.

1. Why are low PCB values in sediment near the Coggeshall Street Bridge considered "anomalous?" The area near the bridge may not be a high sedimentation area, as claimed, since flow velocities increase in the vicinity of the bridge opening.

page 1-4, paragraph 1, line 11 to 13.

1. If the area north of and near the bridge is a sedimentation area, as claimed, the low PCB values for the top several centimeters of the sediments would indicate that high PCB-level sediments are not moving from the upper reaches of the Estuary to the bridge area.

page 1-4, paragraph 2, line 7 to 10.

1. Even a few percent of $50 to $100 million dollars is a great deal of money.
2. Isolation alternatives do not "inherently isolate all contaminated sediments." They must be engineered to do so.

page 1-5, paragraph 1, line 3 to 5.

1. Under the NCP, does "established technologies" mean "proven technologies"?

page 1-5, paragraph 3, line 7 to 9.

1. The later sections of the NUS report do not document that the alleged "due consideration . . . to the health risks and environmental impacts that would be eliminated or . . . created" was in fact given in evaluating remedial alternatives.

page 1-6, paragraph 1, line 1.

1. Why is remediation "urgent"? This is not a spill area. PCBs are not an acutely toxic substance, either in fact (see report of David D. Rutstein,

M.D., attached hereto) or under federal (40 C.F.R. § 261.33(e)) or state (310 C.M.R. § 30.136(2)) regulations. The evaluation for immediate removal prescribed by 40 C.F.R. § 300.65 was not done. Moreover, the remedial action alternatives proposed are permanent, rather than interim, measures.

page 1-6, paragraph 1, line 5 to 8.

1. The cited " . . .lack of documented information on the characteristics and engineering properties of the deeper sediments in the local study area . . ." is a critical shortcoming of the fast-track approach.
2. A "moderate degree of confidence" in the data base is simply not sufficient under the circumstances where tens of millions of cleanup dollars are at stake.

page 1-6, paragraph 1, line 10 to 12.

1. It would be very easy to formulate additional field data collection programs at this time, and to account for their costs in comparing remedial alternatives.

page 1-7, paragraph 2, line 10 to 11.

1. What are the "specific performance standards" referred to here in the extent of the evaluation of dredging alternatives?

page 1-10, paragraph 1, line 3 to 4.

1. Where are the concentration profiles allegedly developed using the Metcalf and Eddy data base? They are not included in the NUS report.

Section 2.0 Project Setting

page 2-5, top.

1. The North Terminal area in New Bedford Harbor is not fully developed because of the problems with the Route 6 bridge. Also, the South Terminal area has been developed for both water-dependent and non-water-dependent uses. It is not clear that PCBs in harbor sediments have affected plans for waterfront deveopment at all.

page 2-5, paragraph 1.

1. There is no data to support the statement that "their use of PCBs in the manufacture of electric capacitors has brought a series of contamination problems to the area." An FS is no place for accusatory statements; rather it is designed to provide an objective evaluation of remedial action alternatives.

page 2-5, paragraph 2, line 5 to 6.

1. Were the wastewater discharges allowed under state or federal permits at the time?

page 2-10, bottom.

1. The benthic species discussion here is purely speculative. In characterising the benthic macroinvertebrate populations of the Estuary, it appears that no actual sampling was done. In addition, the facultative or tolerant species are also indicative of waters that are polluted with sewage. Because of combined sewer overflows, the Commonwealth closed the waters of the Estuary to fishing and shellfishing before PCB problems were ever identified. Also, elevated levels of toxic metals may have depressed the lower levels in the food chain.

page 2-18, paragraph 1, line 1 to 6.

1. It is not acceptable engineering practice to base conclusions on subsurface conditions on 11 borings over a 200-acre study area. Also, the boring locations and logs should be included in the report, or an associated data base report should be provided.

page 2-19, top paragraph.

1. What is the basis for the conclusion that sedimentation has greatly increased since dike construction?
2. The sediment characteristics are critical to this assessment. The discussion here is inadequately generalized.

Section 3.0 Current Problem Assessment

page 3-1, paragraph 1, line 4 to 7.

1. As throughout the NUS report, the presence of public health risks is taken as a given here, when in fact there is no documentation of public health impacts due to the hot-spot areas.
2. Similarly, the report assumes that contaminant migration to the Inner Harbor and Buzzards Bay from the upper Estuary is occurring. No data are included in the report to substantiate this assumption.

page 3-3, top paragraph.

1. The term "soluble" is relative. At the concentrations in which solvents, if any, would be present in the Estuary and harbor water, there would be no increase in PCB solubility.

page 3-3, paragraph 2, line 4 to 7.

1. What are the " . . .serious environmental and public health consequences . . ." alleged here in the context of bioaccumulation?

page 3-3, paragraph 3, line 2.

1. The statement " . . .can also be released to the atmosphere adsorbed into airborne particulates . . ." conflicts with the statement on page 3-5, second paragraph, that

" . . .PCBs . . .are not typically associated with airborne particulate matter . . ."

page 3-4, paragraph 2, top.

1. What effect will the dredging have on the solubility of toxic metals as anoxic conditions are disturbed?

page 3-4, paragraph 2, line 2.

1. Is the Estuary the source of " . . .contaminants . . .found in the air . . ."? No connection between the mudflats/sediments and airborne PCB levels has been quantitatively established to date.

page 3-4, bottom paragraph.

1. The acknowledged variations in sample type, method of collection and, undoubtedly, analytical procedures are inadequately addressed in the report. The gross representation of the extent and character of sediment contamination in the Estuary presented in Section 3.2 is misleading at best and is inadequate for remedial planning purposes.

page 3-5, paragraph 2.

1. There is no data concerning the volatilization of PCBs presented anywhere in the FS. A more likely transport mechanism would be adsorption onto particulate materials that were then suspending by wind action. The biphenyl molecule exhibits a

vapor-pressure of less than 1 mm of mercury at standard temperature and pressure. Therefore, it is unclear how the volatilization of PCBs could be a major contaminant pathway.

page 3-6, top paragraph.

1. Were the 1978 and 1982 test conditions, sampling methods and analytical protocols comparable? This is not addressed in the NUS report.
2. Compared to 1978, the 1982 air monitoring data show a 70 percent decrease in airborne PCB levels. Why has this occurred and what is the significance of this decrease relative to the alleged public health risks of the hot-spot areas?
3. Have not the alleged "risks" due to sediment PCB levels also decreased? Why are the alleged "risks" repeatedly described as "immediate" in this report?
4. There are no data presented to substantiate that the " . . .contaminated portions of the Acushnet River represent a long-term, low level source of PCBs to the ambient atmosphere . . ." Upland soil areas may be the source of airborne PCBs.

page 3-6, first full paragraph.

1. What is the significance of the reported trace metal data?

2. Are the trace metal data rendered non-representative due to placement of samplers near the welding operation?

page 3-6, bottom two paragraphs.

1. Table 3-1 does not include any shellfish data referred to in the text.
2. To what extent can historic changes in the aquatic communities in the Estuary and harbor be attributed to PCBs? There is a long history of industrial discharges other than PCBs, such as plating wastes and textile wastes, and municipal sewage and associated industrial flows continue to be discharged into the Estuary and harbor.
3. There is no data to show that the Commonwealth of Massachusetts closed the Estuary in September 1979 due to PCB contamination. The Estuary was already closed due to combined sewer overflows.

page 3-7, Table 3-1.

1. Are the PCB levels shown for New Bedford area finfishes different from levels in other New England harbors?
2. What are the baseline, species-specific background PCB-levels (i.e., are there any "control" data for area finfish)?
3. For the species reported in Table 3-1, what are the age and size statistics for the fish sampled?

4. The values reported for species for which only 1 or 2 samples were analyzed should not be included in this table since such a small number of samples is not sufficiently representative.

5. The locations where fish were sampled should be specified. Specifically, were any of the samples from the upper Estuary?

page 3-8, top paragraph.

1. Certainly the lobsters were not collected north of the Coggeshall Street Bridge, and probably not inside the Hurricane Dike. Thus, is there any relationship between cleanup of hot spot areas and PCB levels in lobsters?

page 3-8, 2nd paragraph.

1. The draft FS states that " . . .there is little living benthic macrofauna . . ." in locations north of the Coggeshall Street Bridge. What is the data source to support this statement? Have the benthic populations been reduced or eliminated by toxic metals and sewage discharges, or as a result of environmental conditions, such as dissolved oxygen, salinity and temperature?

2. Since benthic fauna are reduced, what are the implications for alleged food chain-related impacts?

page 3-8, paragraph 3.

1. This paragraph contains much unsubstantiated speculation on contaminant levels in untested wetland areas.

2. Wetlands traditionally exhibit a low diversity of plant species so there is no basis for the statement that stressing by contaminants results in low diversity of plant species. It is also stated that no data have been collected on PCBs in the saltwater marshes; yet, it is stated further that fish-eating birds and fowl and other terrestrial animals may be "adversely affected" due to PCB bioaccumulation. There is no data to support that statement.

page 3-9, paragraph 1, lines 8 to 10.

1. The draft FS references Metcalf and Eddy's report concerning "reliable" sediment data. Neither the draft FS nor the Metcalf and Eddy report show that the data in question was subjected to chain-of-custody procedures and, therefore, the data cannot be called "reliable". There is no data to support the statement that "even contaminants several inches or centimeters below the surface are susceptible to resuspension." In view of the general lack of data concerning PCB transport and sediment transport within the Estuary, the draft FS is premature and sets forth conclusions and

recommendations that are unsupportable because of lack of data.

page 3-9, bottom paragraph.

1. Figure 3-1 is a gross oversimplification of the sediment PCB data base and does not reflect differences in PCB levels with sample depth.
2. There is no basis for the conclusion that high PCB concentrations " . . .appear to emanate from the industrial complex on the western shore of the river." Sewer overflows and roadway runoff are two additional PCB sources to the upper Estuary.

page 3-10, Figure 3-1.

1. The sediment PCB levels shown for areas outside the Hurricane Dike around the treatment plant outfalls, the discharge pipe at Cornell-Dubilier, and the combined sewer overflows in Clark's Cove are described as "unknown" on page 3-12.
2. There is no data presented in the draft FS to show the statistical basis for the contaminant concentration distributions shown in these two figures. Data on the Metcalf and Eddy data tape and in the data management report does not indicate that the Estuary is contaminated at levels above 500 ppm of PCBs. This figure shows the entire upper Estuary as a single contaminated hot spot

when, in fact, there are probably several isolated hot spots existing within the Estuary.

page 3-11, Figure 3-2.

1. As with Figure 3-1, the purported sediment PCB concentrations do not accurately represent the distribution of PCBs in the sediments, either in terms of areas of certain concentrations or depth of contamination.

page 3-12, paragraphs 1 and 2.

1. The draft FS states that "PCB discharge to the Estuary was ended in 1977 and the most contaminated sediments have been covered by cleaner sediments since then." This again demonstrates the probability that natural mitigation of PCB contamination and migration is occurring. Thus, the need for expensive remedial action measures is questioned.
2. Statements in these two paragraphs concerning the sampling done to date in the Outer Harbor are conflicting. In paragraph 1 it is stated that these areas have received "...the highest density..." of sampling. In paragraph 2 it is said that "...very few subsurface sediment samples were collected..." in these areas.
3. Where are the maps referred to in the second paragraph?

page 3-13, paragraph 1.

1. What is the source of the estimate that three major contaminant metals form more than one percent of the dry weight in the harbor in some areas?
2. The draft FS at various points discusses contamination relative to PCBs and heavy metals but does not consider both in the development of remedial action alternatives. The draft FS does not clarify any priority difference in cleanup in PCBs and heavy metals. In addition, there is no data presented as to the sources of heavy metal discharges as opposed to the alleged sources of PCB concentrations. The relationship between the two types of contamination is unclear.

page 3-13, paragraph 2.

1. On what basis were the sample locations for recent metals analyses selected?
2. What is the metal concentration vs. depth relationship?

page 3-13, paragraph 3.

1. The presentation of water analysis data is inadequate. No data on metals concentrations in harbor and Estuary water samples are presented.
2. The reported PCB water column concentrations of 6.1 mg/l (=parts per million) is misleading. Since reported solubilities of Aroclors 1248 and 1254 are

less than 0.06 ppm, the 6 ppm value may be biased by the presence of oil or sediment in that sample.

page 3-22.

1. Four factors are listed as necessary to the assessment of real and potential health risks and environmental impact posed by the presence of PCBs, heavy metals and sewage in the Estuary. As to the first factor, the testing of present conditions in the Estuary is either inadequate, incomplete or incorrect. The remaining three factors are the subject of studies presently underway but not completed or yet to be started. If these four factors must be considered in order to assess the real and potential health risks and environmental impact, as the NUS report concedes, why then was the preparation of the draft FS and the recommendations of remedial alternatives not reserved until such time as this admittedly necessary testing has been completed. None of these listed factors can be "considered" for risk assessment because the field and laboratory studies needed to develop the required site-specific data have not been completed.

2. Comments concerning the expected behavior of particular contaminants in the general site environment appear to reinforce the fact that

quantitative data concerning the migration and affect of contaminants are not available.

page 3-23, bottom paragraph.

1. The draft FS states that "...the upper Estuary represents the source of contamination..." To be a source, the contaminants must be in a form or location susceptible to mobility in the site-specific conditions in which they are found. Thus, the "source" in this context needs to be more clearly specified. For example, sediments at a depth of 2 feet are not a source.
2. Regarding the listed potential receptors:
   a. There is little or no human activity in the upper Estuary mudflats.
   b. There are little or no recreational users of the waters and shores of the upper Estuary.
   c. There is no contaminated drinking water associated with the New Bedford Harbor.
   d. The Estuary is closed to fishing or shellfishing.
   e. The low vapor pressures of PCBs would mitigate any volitalization thereof from the mudflats.

page 3-24, paragraph 1.

1. The 1982 airborne PCB levels cited in this paragraph are different than previously cited on page 3-6.

2. The 1982 air monitoring results show a 70% decrease in airborne PCBs since 1978. Assuming comparable sampling conditions, sample collection methods and sample analysis procedures for both years, the 1982 results establish that the risk of exposure to airborne PCBs has greatly decreased and is continuing to decrease.

page 3-24, paragraph 2.

1. The measured levels of PCBs in the ambient air are below any established concentrations for the protection of public health or welfare. As noted, there are no standards for airborne PCBs currently in existence in the U.S. There is no data to quantify the risk to public health or welfare associated with the 10 nannograms per cubic meter (ng/m^3) found in the site area.

page 3-24, paragraph 3.

1. If effects of exposure to airborne PCBs are unknown, the risk therefrom cannot be measured at all. The NUS assessment here is too speculative to base remedial decisions on. For a perspective on the alleged potential public health concern due to long-term exposure to airborne PCBs, consider the following:

   a. Assuming a constant airborne PCB concentration of 80 nanograms per cubic meter, an individual

breathing at a rate of 20 liters per minute would inhale approximately 70 micrograms PCB per month.

b. In comparison, an individual consuming 1 pound of fish per month containing the FDA limit of 2 ppm PCB would injest approximately 1,000 micrograms PCB per month.

page 3-25, bottom paragraph.

1. The conclusion that "...most of the area has PCB concentrations exceeding 500 mg/kg (dry weight)..." is not supported by the available data on sediment PCB levels. In fact, Metcalf and Eddy data tape shows a range of concentrations from 0 to greater than 500 mg/kg.

2. As the last sentence on this page admits, the draft FS has not distinguished between underwater and exposed sediments. Nor, we might add, has NUS distinguished surface, shallow or deep sediments. The characteristics of PCB distribution in the sediments are critical to any risk assessment and remedial planning effort for the upper Estuary.

page 3-26, paragraph 2.

1. The summary of metal concentrations in sediment is very misleading. For example, copper is listed as "above 1,000 mg/kg" when only 1 of 6 samples was

above 1,000 mg/kg. Similar inaccuracies exist here for all listed metals except lead.

page 3-26, paragraph 3.

1. There is little or no use of upper Estuary shoreline for clamming, fishing or other recreational uses.
2. There is no evidence of there being any pure PCB in the upper Estuary sediments.

page 3-26, paragraph 4.

1. What is the basis (data sources) for the statement that " . . . potential risks associated with direct exposure to contaminated sediments containing high levels of PCBs include acute and chronic toxicity, suspected carcinogenic effects, and possible reproductive effects. See report of David D. Rutstein, M.D., attached hereto.
2. What type of "exposure" to PCBs is likely to cause vomiting, etc.? There is little or no direct human contact with mudflats or sediments containing PCBs, which in any case are at dilute environmental concentrations.

page 3-27, top paragraph.

1. Elsewhere in the NUS draft report, the reduced population of benthic macrofauna is noted. Does this serve to reduce the oft-cited food chain effects?

page 3-27, paragraph 2.

1. The "presumed pathway of human exposure to PCBs" has not been demonstrated.
2. Relative to PCB levels in fish, again we raise the question of where the sampled fish were collected, and ask whether the reported PCB levels in fish are relevant at all to the upper Estuary assessment?

page 3-27, paragraph 3.

1. See report of David D. Rutstein, M.D., attached hereto.

page 3-28, top paragraph.

1. The "critical species" exceeding FDA levels should be identified.
2. What are the statistics, if any, on PCB levels in fish and shellfish consumed and/or sold in the New Bedford area?

page 3-28, second paragraph.

1. There is no data in the draft FS or in the literature to show that PCBs are recognized carcinogens. See report of David D. Rutstein, M.D., attached hereto.

page 3-29, top paragraph.

1. The first two sentences here state that "The completion of an exposure path between human receptors and the toxic heavy metals contained in the sediments has not been established. In the

marine environment, these contaminants are probably immobilized." The same statements can be made concerning PCBs.

page 3-29, last paragraph.

1. On what basis is it concluded that ADIs for heavy metals might be exceeded by ingestion of contaminated marine fish and invertebrates?
2. The report does not substantiate the claim that PCBs are a more important public health factor than heavy metals.
3. The statement that "PCBs are a more important health factor than metals" is contradicted on Page 30 by saying that 5 of the 8 toxic heavy metals are associated with carcinogenicity. See report of David D. Rutstein, M.D., attached hereto.

NOTE: The following Table summarizes the NUS risk assessment presented in Section 3.3.3, pages 3-24 to 3-30.

SUMMARY OF NUS ASSESSMENT OF POTENTIAL
HEALTH AND ENVIRONMENTAL RISKS

Media/Type of Risk	PCBs	Toxic Metals
1. Airborne Contaminants		
a. Short-term Exposure	No immediate risk	No risk
b. Long-term Exposure	Unknown, potential elevated risk	No risk
2. Sediment Contaminants		
a. Direct contact (dermal intake)	Not assessed ("some potential")	No risk
b. Food chain effects on humans		
i) acute toxicity	Minimal risk	No risk
ii) chonic effects	ADI would be exceeded if 2 g of 10 ppm fish per day	Not assessed ("some potential")
iii) carcinogenicity	Not assessed ("no safe level")	No risk
3. Surface Water		
a. Human exposure	No risk	No risk
b. Aquatic biota	Not assessed ("likely to be small")	Not assessed ("likely to be small")
4. Groundwater		
a. Human exposure	No risk	No risk

page 3-34, Section 3.5.2.

1. This entire section entitled "Waterfront Development Constraints and Impacts Due to Environmental Contamination" deals with New Bedford Harbor, not the upper Estuary.
2. The basis for the closure of the inner harbor is not presented, but it was in fact closed not becuase of PCB concentrations but because of combined sewer overflow.

page 3-35, bottom paragraph.

1. For what way and to what extent is commercial fishing impacted by the inability to fish in the harbor and adjacent waters? Will remediation of the upper harbor affect this situation?

page 3-36, top paragraph.

1. There is no rational basis for anyone perceiving that fish processed in New Bedford are somehow contaminated because harbor sediments contain PCBs. Fleet location and expansion decisions are made independently of such factors as speculative market perceptions.

Section 4.0 Initial Screening of Remedial Action

page 4-1.

1. The volume of contaminated sediments is never stated in the draft FS, although dredging

column? How can compaction be achieved under water? What foundation conditions do the existing sediments present? How can a suitable base for the embankment be constructed? At what additional cost?

page 2-5, paragraph 3.

1. Subsurface sediment conditions in the river channel cannot be accurately described, as in this paragraph, as a homogenous material, i.e."...10 to 15 feet of...soft silts...or soft sandy silts." Sediment physical characteristics can instead be expected to vary, perhaps considerably, not only with depth but also along east-west transects from north to south throughout the upper Estuary. At this time, the feasibility of subsurface cell excavation via cutterhead dredge is not demonstrated.

pages 2-10 through 2-20.

1. What is the capacity of the proposed temporary containment site for contaminated sediments on the west side of the harbor?
2. Dredged material quantities are presented by NUS in describing the proposed dredging and cell development procedure without consideration of the area and depths of removal and/or replacement. As a result, the proposed cell construction and

technologies are screened in part on ability to dredge 1 million cubic yards over 2 years.

2. The criteria that were used in the initial screening of alternatives were not presented. No independent evaluation of the adequacy of the criteria and their conformance to the NCP can be made.

page 4-2.

1. The discussion about reducing risks to public health and the environment is not supported by earlier discussion in the report in which such risks were unable to be identified or quantified (see preceding summary table of risk assessment.)

page 4-3.

1. Figure 4-1 shows technologies and alternatives that were identified for preliminary screening. Figure 4-2 shows technologies and alternatives that were actually screened. There are no reasons given for dropping various alternatives from consideration either before or during the screening process.

page 4-4, last line.

1. What other work at what other sites?

<u>Section 5.0 Secondary Screening of Remedial Action Technologies</u>

page 5-1.

1. Criteria used in the secondary screening of the remedial action technologies were not presented. Thus, no independent evaluation of the screening nor the evaluated alternatives can be performed. In addition, there are no data presented describing the abilities of the proposed remedial action alternatives.

page 5-5, top paragraph.

1. It is not at all clear why maintenance requirements for an earthen channel would be less than for sheet piling.

page 5-5, paragraph 1.

1. The estimated construction costs should be provided here for the earthen channel and sheet piling channel.
2. The earthen channel costs would also increase significantly if subsurface (i.e., foundation) problems occur.
3. Are there any buried utilities in the upper Estuary? If so, what would be the relocation costs?
4. What is the "major fill project" referred to here?

page 5-6, paragraph 2.

1. Is there really a shortage of flyash in the region?
2. Are the potential impacts of flyash and lime transport by truck significant?

page 5-7.

1. There are no data presented to support the statement that the estaurine waters exhibit high salinity.

page 5-8 and 5-9 (Sediment Dispersal Control).

1. A stated primary goal of remedial actions in the upper Estuary is elimination of alleged PCB releases to the lower Estuary and Buzzards Bay. A necessary part of any evaluation of proposed remedial plans is a comparison among alternatives in terms of potential releases of PCBs, both in the short-term construction period and the longer-term containment period. The discussions in the draft FS give only superficial attention to the potential for PCB transport to the lower Estuary during the dredging and construction periods and suggest only vague concepts for siltation control, with little or no factual information on performance of the silt curtain system proposed. There are no data presented in the draft FS to show that a double silt curtain will prevent suspended sediments from migrating out of the Estuary.
2. These omissions are especially disturbing in light of findings in other PCB-contaminated areas that fine-textured sediments have significantly higher PCB concentrations than coarse-textured materials.

(Technical Paper #51, Summary of Hudson River PCB Study Results, July 1978). It is these fine-textured materials that are the most easily released to the water column as a result of sediment disturbance, and it is also these fine-grained materials that remain in suspension the longest due to their relatively poor settling characteristics.

3. The potential initial dispersion of sediments in the immediate vicinity of dredging is given brief attention on page 5-9 where it is stated that "...it has been generally concluded that resettling of most sediments will take place in the immediate vicinity of dredging or other operations..." Such statements should be qualified in terms of sediment size distribution, dredging technique, hydraulic characteristics of the dredging area (flow velocity and depth, etc.) and other parameters. Also, the potential for impacts resulting from suspension of sediments in the vicinity of dredging will vary due to the presence of sensitive receptors or unique environmental conditions in the vicinity of dredging. The draft FS fails to address these considerations.

4. In Section 5.5 of the draft FS, the use of silt curtains is recommended as a means to control

sediment dispersion. The subsequent explanation of how the silt curtains will restrict sediment dispersion is not convincing, however, in light of findings of the report entitled Literature Review and Technical Evaluation of Sediment Resuspension During Dredging, prepared by the U.S. Army Engineer Waterways Experiment Station, January 1983. In that report, page 130, it is reported that:

a. Under current conditions of 0.5 knots of less, a center tension curtain can be effective, but turbulence may cause the turbid layer flowing under the curtain to quickly resurface beyond the curtain.

b. Silt curtains are not recommended in currents exceeding 50 cm/sec (1.12 miles per hour).

c. Curtain deployment geometrics are critical to performance.

In the March 1983 report Tidal Cycle and PCB Mass Transport Study, by the EPA Environmental Response Team and the Technical Assistance Team, it was noted that current velocities near the Coggeshall Street Bridge reached 1.68 knots (1.93 mph) on the flood tide and up to 3.64 knots (4.19 mph) on the ebb tide. Also noted were strong eddy currents along the bottom of the channel and current reversals (up to 1.3 knots). If flow velocities

exceed the maximums recommended in the Corps of ENgineers report and if significant eddies and flow reversals are prevelant, how can the effectiveness of the silt curtains proposed be ensured?

5. The deployment geometrics of silt curtains are emphasized by the Corps of Engineers in their recommended specifications (Table C-1, Appendix C). The maximum skirt depth recommended is 10 feet, with a clearance between the skirt and bottom of the waterway recommended at 1 to 2 feet. Accordingly, operations depths would be 3 to 12 feet above the bottom of channel. The EPA ERT/TAT Report on PCB Mass Transport shows a channel cross section in the vicinity of the Coggeshall Street Bridge having depths of up to 21.5 feet (bottom of channel to slack flood tide level). If a silt curtain is planned in an area of similar cross section, it appears that a gap of up to 11 feet would exist between the skirt and the channel bottom under certain conditions and even at low tide a gap of 7 feet would remain. The draft FS should explain how the silt curtain will function under deployment conditions not recommended by Corps of Engineers criteria.

page 5-9, top paragraph.

1. On what basis has it been concluded that "...resettling of most sediments will take place in the immediate vicinity of dredging or other operations..."? On page 2-12, it was stated that wave action caused by local seal breezes was sufficient to resuspend sediments in shallow water. Assuming that PCBs are adsorbed onto the sediments, it is possible that the sediments would be fine enough to be transported past a double silt curtain during normal flow or tidal cycle fluctuations. There are no data given in the draft FS to describe the dispersion characteristics of any "oily films" that might be generated. There are no data to support the statement that "high levels of PCB contamination are likely to be associated with the "oily films".
2. The draft FS fails to describe the intended use of silt curtains during construction operations.

page 5-10, top paragraph.

1. Why is it considered necessary to complete dredging within a 2-year period?
2. On what basis was it decided that there was a need to dredge a minimum of 3 feet of sediment?

Section 6.0 Development of Remedial Action Alternatives

page 6-5. bottom line.

1. Health effects have heretofore been undemonstrated and unquantified in relation to contaminants in the upper Estuary, and so quantification of "...reduction of health effects and environmental impacts..." as a result of remedial actions cannot be performed.

2. While the "effectiveness measures" are described in the draft FS, there are no data given under any of the alternatives showing how the effectiveness measures apply. Since no quantitative data are presented concerning the effectiveness measures, it does not appear possible to say that any of the propsoed alternatives meet any of the measures.

page 6-11.

1. It is unrealistic to use a 10% discount rate and 0% inflation rate. In addition, only bottom line costs are presented for each cost category shown in Section 8. More detailed cost information should be presented in a feasibility study to allow independent evaluation of cost figures.

page 6-12, paragraph 1.

1. Filter fabric would not be needed to prevent contaminant migration through the glacial till, if adequate compaction of the till is achieved in construction.

page 6-12, paragraph 2.

1. Filter fabric would not be needed to prevent contaminant migration through the glacial till, if adequate compaction of the till is achieved in construction.

page 6-12 through 6-18

1. The discussion presented in these pages is confusing both in terms of what "options" are supposedly being subjected to a cost-effectiveness analysis, and what the basis is for the conclusions drawn. No cost or effectiveness data are presented.

Section 7.0 Detailed Description of Remedial Action Alternatives

1. This section presents information on detailed descriptions of the various remedial action alternatives. However, more detail is required such as concept level plans, cross-sections, and design criteria so that the technical aspects of each of the alternatives can be independently evaluated. In addition, cost breakdowns and tabulations by operable unit should be presented so that costs can be independently verified.

7.2 Hydraulic Control with Sediment Capping (pages 7-1 through 7-9)

1. This alternative will result in permanent alteration of the tidal marshlands on either side of the upper Estuary since tidal flow through Coggeshall Street Bridge will be greatly reduced, first by the temporary sheet pile curtain, then by the permanent river channel embankments. Coupled with the proposed placement of 3 to 4 feet of clean fill over mudflat and wetlands areas containing PCBs, the net result will be the creation of upland on either side of the new channel above the point where the tidal flows extend alongside the channel. The nature of the permanent alterations to the Estuary and the environmental significance of the changes are not adequately addressed.
2. Why is the new channel extended all the way to the bridge? Some 2,400 feet of embankment could be saved if the channel were ended 1,200 feet from the bridge, leaving low PCB-level sediments to be covered by natural sediment deposition that would occur in the vicinity of the bridge.
3. The proposed channel embankments would be built upon sand bases. These sand layers will represent a path of least resistance for flow between the covered sediments outside the channel and the river/tidal flow within the channel. A hydraulic

cutoff wall in the center of the embankments may be needed.

4. The proposed design could be altered to eliminate the need for filter fabric and rip rap side slope and bottom protection. For example, the channel embankments can be placed 160 feet apart instead of the proposed 80 feet to achieve non-erosive flow velocities in the channel. Also, the compacted glacial till will itself, if properly installed, be relatively impermeable to toxic metals and PCBs.

5. How was the 3 to 4 foot depth of cover material selected? Are there certain bottom feeding organisms anticipated that will dig that deep into the cover material?

6. There is no engineering design basis presented for constructing a three foot thick riprap layer. In addition, there are no data presented concerning potential erosion from the embankments or the sediment cap.

7. There are no data presented to describe how the emplacement of the sediment cap will change the hydraulic profile of the Estuary. No hydrologic design criteria were presented in the development of this alternative. In addition, there are no data presented to show that the sediments in the Estuary possess adequate strength to support the

embankments and other structures proposed. It appears that a more thorough subsurface investigation of the Estuary is warranted.

7.3 Sediment Dredging With In-Harbor Disposal (pages 7-9 through 7-19)

1. Why was an earthen embankment rather than sheet piling chosen to construct the temporary containment site at the cove on the western shore?
2. This temporary containment site is in close proximity to residential neighborhoods. The potential adverse impacts of this part of the plan have not been evaluated.
3. There is no Step proposed for dismantling the temporary containment area. What will be the condition of this area upon completion of the project?
4. Given settlement and dewatering that will occur in the temporary containment area, will hydraulic transport of stored sediments to the proposed in-harbor disposal site be feasible?
5. Why will the proposed in-harbor disposal site be located on the eastern side of the upper Estuary, thereby permanently destroying the tidal marsh in that area?
6. Placement of the glacial till embankment will be extremely difficult under water since the silts in

the till will tend to become suspended easily, resulting in extensive siltation of the river and the harbor.

page 7-12, paragraph 1, lines 3 and 4.

1. There is some text missing here.

page 7-12, paragraph 2, lines 7 and 8.

1. What will be the expected extent of "overdredging" with the hydraulic pipeline cutterhead dredge?

page 7-12.

1. There are no data presented to support the design basis for fixing the elevation of the containment embankment. There are also no data presented to justify dredging to a three foot depth. Any link between contamination levels, action levels for cleanup, and depth of dredging should be presented.

page 7-14.

1. There are no data presented to justify the use of either a partially or fully lined containment embankment. It is unclear whether this alternative is supposed to represent an alternative that conforms with all other environmental regulations such as RCRA or Commonwealth of Massachusetts regulations. Therefore, the need for a liner is questioned.
2. The need for double handling of the contaminated sediments from a temporary disposal site to a

permanent disposal site is also questioned. Every additional handling can result in additional spills and potential exposure.

page 7-16, top paragraph (Step 7:

Treat Water)

1. The draft FS does not discuss the problems that will be faced in dewatering the contained dredged material. What are the expected dewatering difficulties and how will they be resolved? At what additional cost?
2. The anticipated volume of supernatant water requiring treatment, and the level of treatment to be required, are necessary to accurately size and cost the treatment system. What are the design assumptions for water treatment upon which the NUS treatment costs are based?

7.4 Sediment Dredging With Upland Disposal (pages 7-19 through 7-25) (page 7-22, paragraph 1 (Step 1).

1. Potential locations for an upland disposal site within a 10-mile radius of the New Bedford Harbor are not identified in the draft FS. This omission makes it impossible to assess the feasibility of the dredging/upland disposal alternative. The environmental resources that would be lost and other adverse impacts due to construction of an

upland facility are unknown. The design features of the upland facility, and associated development costs, are also unknown. A rigorous evaluation of this alternative according to NCP guidelines cannot be performed on the basis of conceptual speculation. Thus, this alternative should either be rejected as an option or be adequately defined so that a serious evaluation of it can be put forth.

page 7-24, paragraph 1 and 2 (Steps 3 and 4).

1. What will be the design capacity of the temporary containment site to be located in the western cove? Will there be sufficient capacity to hold dredged material from the "entire upper harbor"?
2. What is the expected solids content of the dredged material? What volume of decanted water from the temporary site will require treatment? What level of treatment will be necessary prior to discharge?
3. How will the dredged materials be dewatered in the temporary site? How long will the dewatering process take? At what moisture content will the sediments be considered sufficiently dewatered to be trucked to the upland disposal site?

page 7-24, paragraph 3 (Step 5).

1. Over what period of time will sediments be trucked to the upland site?

2. How many truck trips from the temporary containment site will occur? To move 1 million cubic yards of sediment in 16 to 20 cubic yard loads means 50,000 to 60,000 truck trips will be needed. Over a 3-year period, this would mean that during the average weekday from 22 to 27 truck trips to and from the upland disposal site would be made.
3. What are the anticipated routes of travel of the trucks? Will densely populated or other residential areas be traversed? What are the public safety impacts of the trucking? What will the impacts on the flow of local traffic be?
4. Will the trucking program result in a need for increased police service to control traffic? Will maintenance requirements on roadways be increased due to the heavy trucking?
5. What is the likelihood of spills during trucking and how will any such spills be addressed? What is the likely exposure of the public to the dredge spoils during trucking?

page 7-24, paragraph 4 (Step 6).

1. The draft FS makes no mention of provisions for treatment of leachate to be collected from the upland disposal site. How much leachate is expected to be generated? Where will the leachate

be treated? Will a separate treatment system be needed at the disposal site? At what cost?

page 7-25, paragraph 1 (Step 7).

1. What is the expected long-term integrity of the membrane cap? Will settlement of the dredged material within the upland disposal site occur? If so, to what extent? What provisions can be made to minimize long-term settlement, and at what additional capital cost?

page 7-25.

1. There is no Step proposed for dismantling the temporary containment area located in the western cove. Have the costs of dismantling the containment area and restoring the cove been included in the cost estimates for the upland disposal option? If not, what are the estimated additional costs?

Section 8.0 Evaluation of Remedial Action Alternatives

page 8-1, paragraph 2.

1. There are, according to data previously cited in the NUS report, at least two natural phenomena occurring that are contrary to the statement that "...the no-action alternative will sustain these and other containment levels":

a. Airborne PCBs levels reported downwind of the study area for 1982 are 70 percent lower than reported in 1978.

b. A sedimentation rate of 1.7 to 4 cm/yr (0.7 to 1.5 in/yr) suggests that natural covering of contaminated sediments is occurring which may eventually lead to complete isolation of the PCBs. This strongly suggests that the no-action alternative is the most cost-effective, environmentally sound alternative.

page 8-2, paragraph 1.

1. The fish species reportedly exceeding or nearing the FDA limit of 2 ppm may not be present in the upper Estuary. Certainly lobsters are not in the upper Estuary.

2. Why is it expected that "...species within the hot spot areas will continue to bioaccumulate PCBs..." when:

   a. There are no data on the species within the hot spot area; and,

   b. Natural sedimentation processes may make contaminants unavailable over time?

page 8-2, paragraph 2.

1. What is the source of the information on invertebrate species diversity in the upper Estuary?

page 8-3, paragraph 2.

1. In what way is aquatic vegetation along the shorelines and within wetland areas impacted by contaminants in the water column and sediments?

page 8-4, paragraph 3.

1. It should be explained here why it is concluded that low-level release of PCBs to the air will continue. Airborne PCB levels in 1982 were 70 percent lower than in 1978. It is possible that perhaps in a relatively short period of time, downwind PCB levels will decrease to areawide background levels?

page 8-4, paragraphs 2 and 3.

1. This brief discussion of the impacts of channel construction is an inadequate assessment of the substantial adverse effects that will be associated with this option. The fundamental nature of much of the upper Estuary will be permanently altered as a result of channel construction.

pages 8-4 and 8-5.

1. There are no quantitative data presented to show that the impacts of dredging, channelization of the river, sediment capping and other components of

various alternatives will not have severe adverse environmental impacts. If the bottom profile of the Estuary is raised by three to four feet, it is possible that tidal mudflats will be exposed for a good percentage of the time thus precluding re-establishment of aquatic communities. In general, it appears that the environmental impacts and other consequences of all the alternatives have not been fully detailed and described.

2. Under the hydraulic control alternative, it appears that the salinity in the Estuary will actually increase rather than decrease as stated, due to the lack of mixing with fresh water.

page 8-5, paragraph 1 through 4.

1. The discussion here greatly understates the permanent impacts of the channelization/sediment capping concept. A critical issue left unresolved is the northward extent of tidal flow after construction. This elevation must be known in order to calculate the wetland acreage eliminated under this plan.

2. Since the existing benthic population is "sparse" does it follow that the alleged food-chain link for PCB impacts is self-limiting?

page 8-6.

1. There are no data presented to support the statement that "bottom-feeding organisms will be severely impacted since the populations are currently sparse as a result of the high levels of contamination". It is possible that bottom-feeding organisms are not present because tidal fluctuations cause exposure of the substrate to such an extent that those populations will not be supported. In addition, the combined sewer overflow problem could also have a large adverse affect on bottom-feeding populations. No quantitative data are provided.

page 8-7, paragraph 4.

1. The cited "critical and beneficial" impacts of dredging should be further explained and quantified.
2. There are no data presented to support the statement that "movement of PCB-contaminated sediments would also be eliminated". During dredging, resuspension of sediments in transport of PCBs adsorbed to those sediments is expected.

page 8-9, bottom paragraph.

1. Are the saltmarshes that would be eliminated by construction of a disposal site currently impacted by PCBs and metals or not?

2. How many acres of saltmarsh will be lost by the construction of the in-harbor disposal site? The draft FS estimates the loss of 20 acres, but from Figure 7-6 it appears that approximately 40 acres will be lost.

page 8-11, paragraph 1.

1. The impact of the need to treat supernatant water is greatly understated in the draft FS. For rotary cutterhead dredges, a solids content of 10 to 30 percent by weight can be expected in the dredged slurry. This means that, along with a projected 1 million cubic yards of dredged material, from 7 to 9 million cubic yards of water would be pumped. How much of this water will be treated prior to discharge? What is the design flow rate of the treatment system and how long is it expected to be in operation?
2. What is the basis for treating the discharge water to a concentration of 1 part per billion? Is this level of treatment cost-effective?

page 8-13.

1. It is impossible to assess the feasibility of upland disposal sites when those sites are not identified.
2. What alternatives for a temporary containment site other than the western shore cove were considered?

3. Refer to additional comments presented above for pages 7-22 through 7-25.

page 8-13, 8-14.

1. The entire discussion concerning public health impacts appears to be speculative in nature. There are no quantitative data presented to document an existing health threat from PCB-containing sediments in the harbor nor an expectation of adverse public health impacts if the no-action alternative is selected. Given the probability of natural mitigation of PCB levels in the Estuary and the water column, the need for any action is questioned. In addition, the general literature does not support alllegations of severe public health impacts resulting from contact with PCBs.

page 8-14, top paragraph.

2. The discussion here is inconsistent with the risk assessment discussion of Section 3.3.3, wherein little or no risks were identified.

3. The "potential pathways of human exposure to PCBs" are greatly overstated in this paragraph.

   a. Airborne PCB levels are already decreasing rapidly without remedial action.

   b. Waterborne PCBs are not a significant exposure pathway.

c. It is not clear how sediment is a potential pathway of human exposure.

3. On what basis is ingestion of fish and shellfish from the Estuary considered to be a "critical pathway?"

page 8-15, top paragraph.

1. What is the alleged "risk to humans?"

page 8-16, paragraphs 2, 3 and 4.

1. Again, what are the alleged "public health risks" being mitigated?
2. What data are available to support the assumption the sediment dispersal can be controlled during dredging?
3. Under what conditions could a breach of the embankment or cap occur?
4. What is the expected magnitude of the problem of disturbance of PCB-laden oily films during dredging? On what basis is it concluded that the silt-curtain with absorbants will even be able to partially control the oily releases? Is "partial" control quantified? If oil releases during dredging are found to be a greater problem than indicated in the draft FS, what mitigative measures can be applied and at what cost?

page 8-17, bottom.

1. Again, the "risk to public health" is assumed here, but not documented anywhere in the report.

page 8-18, paragraph 2.

1. The entire paragraph on economic losses and socioeconomic impacts is pure speculation unsupported by any data.

page 8-19, paragraph 1.

1. The 2000 pounds of PCBs per year figure is not "noted previously" in the report.
2. Apparently, the basis and source of this estimate is the March 4, 1983 Tidal Cycle and PCB Mass Transport Study by the Environmental Response Team and the Technical Assistance Team (ERT/TAT) Edison, NJ. That study was conducted during a 39-hour period on January 10-12, 1983. The following questions relate to the Tidal Mass Transport Study:
   a. How "representative" is the storm event that occurred during the ERT/TAT field sampling? Wind gusts of 70 miles per hour were reported. How frequently do such winds occur in the study area?
   b. How were the "average PCB concentration" values for the tidal flow reported on Table 5 arrived at?
   c. The ERT/TAT report refers to two filter sizes (0.45 micron and 6.5 micron). What size

filters were used to prepare water samples for dissolved PCB analysis?

page 8-19, bottom.

1. How will the construction projects reduce unemployment in the New Bedford area?

page 8-20, top.

1. How is raw material demand a related issue?

page 8-24 through 8-27 (Table 8-1 through 8-4).

1. Details of the various cost estimates should be provided to facilitate independent review.

Section 9.0 Conclusions and Recommendations

page 9-1.

1. Other than recommending that the "no-action" alternative not be selected, no recommendations are offered. This paragraph describes Table 9-1, a graphic summary of the NUS impact evaluation of alternatives. Line 7 states that "...serious public health, public welfare and environmental problems and impacts would persist under the no-action alternative." There is no basis for this statement. The NUS risk assessment in Section 3.3.3 of the draft FS even concludes there was little or no risk posed by the site for seven risk categories examined. See report of David D. Rutstein, M.D., attached hereto.

2. Since the chemical behavior of PCBs is compatible with isolation and containment schemes as described in the draft FS, it is questioned why the natural processes of isolation that are currently occurring are not allowed to proceed without intervention.

C. COMMENTS ON SEPTEMBER 1984 ADDENDUM

Section 1.0 Introduction

page 1-1, paragraph 2.

1. The draft FS states that the alternative involving dredging with in-harbor disposal in subsurface cells was developed to provide an in-harbor disposal option that would not irreversibly damage wetland areas along the shoreline of the Estuary. Have any other in-harbor disposal options been considered and evaluated by NUS?

Section 2.0 Dredging with Disposal in In-Harbor Subsurface Cells

page 2-3, paragraph 2.

1. This paragraph does not acknowledge or address the difficulties of construction of an embankment by placing glacial till in 6 to 12 inch lifts on top of a 4 foot sand blanket previously placed on silty mucky sediments. How will glacial till be placed in a submerged condition without tremendous material loss due to suspension in the water

filling procedure is presented as a simple problem of conservation of material quantities when, in fact, the procedure is much more complex due to:

a. Expansion of quantities to be handled as a result of decreased sediment density and compaction upon being dredged.

b. Material handling difficulties due to consolidation and dewatering within the temporary containment areas.

c. The difficulties of placement of silty fine sediments into the disposal cells under water. The problem of sediment resuspension and transport out of the intended disposal cell is not addressed by NUS.

3. There are no Substeps proposed for construction of embankments for each of the subsurface cells.

page 2-22, bottom paragraph.

1. It is assumed here that the proposed sediment dispersal controls will be effective. Refer to comments and questions presented above in B. Specific Comments, NUS pages 5-8 and 5-9. In the event it is found that the proposed sediment controls are not effective, what additional sediment control measures are available? At what cost?

2. Is it assumed that oil phase-PCBs will also be effectively contained by the sheet piling and silt curtains? If so, on what basis?

3. What are the technical and environmental justifications for the statement that "[a]ny increased water column concentrations resulting from dispersal and resolubilization will not be significant in relation to the overall effects on aquatic biota?

page 2-23, bottom paragraph.

1. The alleged inclusion of salt marsh areas within areas of highest PCB concentrations is unsubstantiated by the existing data base for the study area. There has been little or no testing of PCB levels in the marsh areas.

page 2-24, top paragraph.

1. What quantified proof of the alleged beneficial impacts of dredging is available? No data to support the alleged beneficial impacts are presented in the draft FS.

page 2-24, bottom paragraph.

1. What are the public health and environmental risks associated with:

   a. Volatilization of PCBs from sediments exposed as a result of dewatering?

b. Potential increased mobility of toxic metals due to oxidation?

c. Creation of an attractive nuisance in the form of free water surface in contaminated areas?

2. What degree of sediment dewatering is anticipated? How will dewatered sediments be transferred to the proposed permanent disposal cells? At what cost?

page 2-25, paragraph 2.

1. What is the technical basis for the statement that "....the sediments are primarily silts and silty sands that should quickly settle in the immediate vicinity of (disposal) operation..."?

2. What current and flow effects will result from a submerged disposal pipe? Will suspended sediments be propelled upwards and out of the cells?

page 2-26, top paragraph.

1. This paragraph is mere speculation that adverse impacts from release of contaminated water from the sediments will be insignificant. What about the potential for release of PCB-laden oils? toxic metals?

page 2-27, top paragraph.

1. What are the alleged "....overall risks to public health..."?

page 2-27, paragraph 2.

1. What "....risk to humans..."?

page 2-28, bottom paragraph.

1. What are the alternatives to locating a temporary containment site in close proximity to the residential areas on the New Bedford side of the river near Riverside Avenue?
2. The potential for unbearable odor problems resulting from the disturbance of anoxic sediments followed by placement in the temporary containment site is not even mentioned by NUS.
3. Why does the draft FS imply here that unquantified increased airborne PCB levels are somehow acceptable because they are temporary?
4. How long will the temporary containment site be in use?
5. Will local property values decline due to the presence of the temporary storage site?

page 2-29, paragraph 2.

1. What impact on unemployment is projected in terms of jobs for the Greater New Bedford work force? Are the presently unemployed groups qualified to perform hazardous waste remedial work?
2. What will be the resulting unemployment if businesses located in this economically-depressed area are obliged to fund this or any other of the prohibitively-expensive remedial alternatives proposed in the draft FS?

page 2-30, paragraph 2.

1. What is the basis for the estimate that remaining Estuary sediments will, on average, contain less than 1 ppm PCBs?

page 2-30, bottom paragraph.

1. What is the cited "...appropriate factor of safety"?
2. We agree that testing of deep cores would be necessary before implementation of this alternative. We would add, however, that physical as well as chemical testing would be needed, and that the testing program would extend throughout the upper Estuary. What would the cost of the sampling and testing program be, and how long would it take?

Section 3.09 Incineration of PCB-Contaminated Sediments

We agree with the NUS evaluation that incineration is not a cost-effective alternative for the upper Estuary, and may have substantial adverse impacts associated with toxic metals and organic chemical byproduct emissions.

Section 4.0 Disposal At An Existing Out-of-State Landfill

We agree with the NUS evaluation that disposal of sediments from the upper Estuary in an existing landfill facility is not cost-effective and should be eliminated from further consideration. Given the current situation at the CECOS facility in New York, it is questioned why that

facility was evaluated as an alternative for disposal at an off-site location.

David D. Rutstein, M.D.
January 2, 1985

Confidential

SUMMARY OF SCIENTIFIC EVIDENCE

Human PCB Hazards in General and in New Bedford

PCB Toxicity

Polychlorinated biphenyls (PCBs) in concentrations far higher than those in the food chain in the United States and, in particular, in New Bedford are required to produce clinical evidence of toxicity in man. Indeed, there is not a single documented human case of PCB poisoning in the United States resulting from the ingestion of fish or from any other kind of food.

In contrast, acute and chronic human toxicity from PCBs alone has occurred in the United States and throughout the world as a result of occupational exposure as, for example, in the manufacture of electrical capacitors. Those chronically exposed in industries to PCBs tend to have the highest reported serum levels [often >50 parts per billion (ppb)]. And yet, the only clear cut clinical manifestation of the high PCB levels is the skin rash, chloracne, which disappears after occupational exposure is terminated, but while the serum PCB level may remain very high. Follow-up studies of occupationally-exposed persons in industries including one in New Bedford (Aerovox) reveal that "all cause mortality" including "all cancer mortality" in occupationally-exposed workers was lower than expected when compared to a similar population that had not been exposed to PCBs. In individual follow-up reports of occupationally-exposed workers one or another condition or tumor has been reported, but at levels that were not statistically significant. Moreover, from report to report there has been no consistency in the occurrence of a particular disease, e.g., cirrhosis of the liver or arterial hypertension, or in the type of tumor, e.g., cancer of the rectum.

Biochemical studies of occupationally exposed individuals reveal high PCB levels in serum and body fat that disappear very slowly over time. Relatively high serum triglyceride levels, the significance of which is not clear, have also been reported (although without documentation that blood specimens were collected from subjects in the fasting state).

Long-Term Effects and Carcinogenicity

In 1936 the first of hundreds of cases of PCB poisoning from occupational exposure in the U.S. was identified. Since that time groups of occupationally-associated cases have been followed for varying periods of time and, with one exception, no serious long-term effects including carcinogenesis have been noted.

The one exception which attracted a great deal of attention appeared in a letter to the Editor of the New England Journal of Medicine for August 14, 1976, from Bahn, et al., of the University of Pennsylvania that reported "a possible new carcinogenic hazard" from PCBs. It stated that "two malignant melanomas are known" among 31 exposed employees in a capacitor industry, and one diagnosis of melanoma was made in "another group" with "less exposure."

A few months later in a subsequent issue (January 13, 1977), a responding letter from Charles Lawrence, Ph.D., of the New York State Department of Health was published under the NEJM caption of "PCB? and Melanoma". Dr. Lawrence noted in the Bahn letter the lack of "essential" information concerning occupational exposure to other carcinogenic substances known to be used in the same industry. The reply from Bahn, et al., published in the same NEJM issue did not provide the requested information but the letter did end with the statement, "We agree, however, that further

information is essential." During the eight years since the publication of the Bahn letter, no further information has been published about the association of PCBs and melanoma by the Bahn group.

The lack of association between PCB poisoning and the later occurrence of malignant melanoma is strengthened by a report on the epidemiology of ocular melanoma covering the 11-year period (1967-1977) in the State of Ohio. A special study was made of one particular pollutant, PCB, supposedly associated with melanoma. Although the thoroughness of the study revealed a relatively high population incidence of ocular melanoma (1.09 per 100,000 persons per year), the distribution throughout the State of Ohio was uniform both geographically and from year to year. Indeed, it was demonstrated that despite the presence of a high level of PCBs in many of Ohio's industrial counties and a concentration of PCBs in fish at a level greater than 2 ppm in other counties, the distribution of cases of the disease was uniform throughout the state. In a word, the prevalence of ocular melanoma did not correlate with the environmental presence of PCBs.

In light of the above evidence on the Bahn report and the Ohio survey, plus the lack of a single other case of malignant melanoma anywhere in the world from PCB exposure, it is fair to conclude that there is no association between PCB poisoning and malignant melanoma.

"Yusho"

Yusho is an illness resulting from the ingestion of contaminated rice-bran cooking oil. Two epidemics of Yusho have been reported from the Orient: the first in Japan in 1968 and the second in Taiwan in 1979. Both epidemics resulted from the contamination of rice-bran cooking oil with PCBs used as a heat-transfer agent which had leaked into the cooking oil during the

process of manufacture. The epidemiology and the natural history of the disease and the clinical picture and the course of illness in the patients in both Yusho epidemics were similar.

It was assumed for about a decade that Yusho was a severe manifestation of PCB poisoning, but as time went on many discrepancies occurred until now it appears that it is probably an entirely distinct disease. The symptoms of Yusho are more intense and more widespread than those of PCB poisoning. In addition to the chloracne usual in PCB poisoning, many patients had a characteristic pattern of pigmentation widely dispersed in the skin, nails, conjunctiva and gums. In the skin, the pigmentation was associated with many follicular cysts and black comedones. Yusho patients had other symptoms which do not occur in PCB poisoning including swelling of the upper eyelids, enlargement of the meibomian glands with ocular exudates and the formation of cysts. Most unusual, the symptoms were very persistent and diminished very little as the concentration of serum PCBs gradually faded away. Finally, it was realized that the course of Yusho patients with their extensive symptomatology differed markedly from those with acute and chronic PCB poisoning from occupational exposure who had persistently higher PCB levels than the Yusho patients, and yet had become completely asymptomatic.

Early on, it had been determined that the rice-bran oil containing PCBs that precipitated Yusho had also been contaminated with other PCB-like compounds. After years of study it has now become clear that the severe and unusual manifestations of Yusho were caused not by the PCBs, but by a related set of compounds, the polychlorinated dibenzofurans (PCDFs).

Since it is now established that the disease Yusho is not due to the ingestion of PCBs alone via the food chain, it can now be succinctly stated

that in the medical literature of the world there has not been a confirmed single case of pure PCB poisoning that has occurred solely via the food chain.

Measurement of PCB Blood Levels in New Bedford Residents

Two studies were performed on New Bedford residents, the first in 1981 and the second in 1982.

Data collected on "Greater New Bedford Residents" in 1981 are biased in favor of finding high levels of plasma PCB concentrations, thus

1. Of the 30 "residents studied," nine were residents of Canton.
2. Of the total of 21 New Bedford residents
   A. Seven had known occupational exposure which by itself is associated with high levels of PCBs, and four of these also gave a history of eating Acushnet River fish.
   B. Nine others gave a history of eating Acushnet River fish.
   C. One has been a professional scuba diver in the New Bedford Harbor for 25 years.
   D. Only four individuals remain from the entire group of the 21 New Bedford residents who have not had prior unusual exposure to PCBs (their levels are all normal).

In 1982, "The New Bedford PCB Study - Preliminary Findings" produced no significant results concerning the general population of New Bedford, as is confirmed by quotations from the report:

> P. 1, para 3: "The findings of this study must be interpreted cautiously for several reasons. Since the persons studied were volunteers, many of whom had known exposure to PCB's, no conclusions as to the PCB levels in the general population of New Bedford can be made. This question could be answered only by studying a random sample of New Bedford residents. The number of subjects studied was only 51 so that it is difficult to control for confounding variables such as age or weight."

P. 2, para 3: "...PCB levels >30 ppb were found in 16 persons. The highest levels were among those with long term occupational exposure. Nine of the 16 above 30 ppb had received occupational exposure. (Table 2). The remainder had frequently eaten fish or eels caught in the Acushnet River. (Table 3). It has been reported that New Bedford sewage contains PCB's. The wastewater treatment plan workers did not have elevated PCB levels. (Table 2)."

P. 2, para 4: "The health data are difficult to interpret because of the small number of people studied."

P. 2, para 6: "In summary, the highest PCB levels were found in occupationally exposed persons, there was no evidence of a relationship between PCB and liver disease, a slight PCB level association with hypertension, and no greater than expected numbers of chronic conditions."

Thus, there are two separate studies of New Bedford in 1981 and 1982 which cannot be interpreted because of inadequacies of design and performance.

The most important conclusion remains. If it is desired to know the status of the concentration of PCBs in the population of New Bedford, it becomes necessary to perform a properly designed study of a random sample of the New Bedford population in which there has not been reported a single case of PCB poisoning via the food chain.

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CURRICULUM VITAE
David B. Rutstein, M.D.

Born: February 5, 1909, Wilkes-Barre, Pennsylvania

1930 S.B. (cum laude) Harvard College
1934 M.D. (cum laude) Harvard Medical School

1937 Licensed to practice medicine, States of New York and Massachusetts

1937 Diplomate, National Board of Medical Examiners
1941 Diplomate, American Board of Internal Medicine (in Internal Medicine and Cardiovascular Disease)
1949 Diplomate, American Board of Preventive Medicine and Public Health
1951 Commissioned Medical Director, United States Public Health Service (R)
1976-82 Distinguished Physician, Veterans Administration

Honors

American Academy of Arts and Sciences (Fellow)(Councilor 1973-1977)
Alpha Omega Alpha
Delta Omega
Sigma Xi
Benjamin Franklin Magazine Award
American Heart Association, Award of Merit
American Heart Association, Gold Heart Award
Chevalier, Legion d'Honneur de France
Academie Nationale de Medicine (Paris) Correspondant Etranger
Swedish Medical Society - Jubilee Medal
Honorary Member, The Royal Society of Medicine, London
Senior Member, Institute of Medicine, National Academy of Sciences

Hospital Training

1932-34 Resident in Bacteriology, Children's Hospital, Boston
1934-35 Rotating Internship, Wilkes-Barre General Hospital
1935-36 House Officer, Second Medical Service (Harvard) Boston City Hospital

University and Medical School Appointments (Faculty)

1936-37 Research Fellow in Pediatrics, Harvard Medical School at Children's Hospital Medical Center
1936-37 Assistant in Bacteriology, Harvard Medical School and Harvard School of Public Health
1937-38 Assistant in Medicine, Albany Medical College
1938-40 Instructor in Medicine, Albany Medical College
1940-43 Assistant Professor of Medicine, Albany Medical College
1943-47 Instructor in Medicine, College of Physicians and Surgeons, Columbia University, New York
1952 Professor of Medicine pro tempore, Syracuse University Medical School
1947-65 Professor of Preventive Medicine, Harvard Medical School
1966-75 Ridley Watts Professor of Preventive Medicine, Harvard Medical School
1947-69 Head, Department of Preventive Medicine, Harvard Medical School
1970 First Visiting Professor, Alpha Omega Alpha, University of Vermont
1970-71 Visiting Institute Lecturer, Massachusetts Institute of Technology
1975- Ridley Watts Professor of Preventive Medicine, Emeritus, Harvard Medical School

Medical School Appointments (Committees)

1949-54 Chairman, Curriculum Committee, Harvard Medical School
1950-54 Member, Administrative Board, Harvard Medical School
1963-65 Chairman, Clinical Section, Curriculum Committee, Harvard Medical School
1967-69 Member, Joint Committee Harvard University - Massachusetts Institute of Technology on Engineering and Living Systems; Chairman, Subcommittee on Medical Care; Member, Subcommittee on Education and Research
1967-70 Member, Clinical Council, Harvard Medical School

Medical School Committee Appointments (continued)

1968 Member, Center for Community Health and Medical Care, Harvard Medical School
1969 Committee on Exchange Visitors, Harvard Medical School

Hospital Appointments

1938-39 Clinical Assistant in Medicine, Albany Hospital
1939-42 Assistant Attending Physician, Albany Hospital
1943-47 Associate Visiting Physician, First Medical Division (Columbia) Bellevue Hospital
1947-49 Consultant in Preventive Medicine, Massachusetts General Hospital
1949-61 Associate Physician, Massachusetts General Hospital
1947-75 Physician, Children's Hospital Medical Center
1947-75 Visiting Physician, House of Good Samaritan
1947-75 Consultant in Preventive Medicine, Peter Bent Brigham Hospital
1948- Consultant in Preventive Medicine, Boston Hospital for Women
1949-75 Consulting Physician, Massachusetts Eye and Ear Infirmary
1955-73 Consulting Physician, Boston City Hospital
1961- Consultant in Preventive Medicine, Massachusetts General Hospital
1964-80 Consultant in Preventive Medicine, Beth Israel Hospital

Appointments

1937-40 Medical Consultant in Pneumonia, New York State Department of Health
1940-42 Chief, Cardiac Bureau, New York State Department of Health
1942-43 National Director, Gas Protection Section, Medical Division (USPHS) Office of Civilian Defense
1943-45 Acting Director, Bureau of Laboratories, New York City Department of Health
1943-46 Deputy Commissioner, New York City Department of Health
1946-47 Medical Director, American Heart Association and American Council on Rheumatic Fever
1946-48 Consultant, Research and Development Board, Office of the Secretary of War
1948-73 Consultant, Office of the Surgeon General, various Bureaus, and the National Institutes of Health (USPHS)
1961-68 Consultant, The Worcester Foundation for Experimental Biology
1961-66 Consultant, Protein Foundation, Inc. (Blood Research Institute)
1965-69 Peace Corps National Advisory Council
1968-69 Consultant, American Cancer Society
1968-69 Consultant, The Rand Corporation
1971-73 Consultant, Merck Sharp & Dohme
1974-78 Consultant, Center for Blood Research
1974 Consultant, Tosehe-Omran, Teheran, Iran

Society Memberships

American Association for the Advancement of Science (Fellow)
American Association of University Professors
American Epidemiological Society; Vice-President, 1965-66, President 1966-67
American Federation for Clinical Research
American Genetic Association
American Heart Association; Vice-President 1954-57
American Public Health Association (Governing Council 1962-65)
American Rheumatism Association
American Society for Clinical Investigation
Boylston Medical Society, President 1960-61
International Epidemiological Association
Massachusetts Medical Society
Biomedical Engineering Society

Society Memberships (continued)
Massachusetts Public Health Association
New York Academy of Medicine (Fellow) 1944-62
New York Academy of Science (Fellow)
The Harvey Society
World Commission on Cerebral Palsy

Past Committee Appointments

1945-57	Board of Directors, American Heart Association, Executive Committee 1948-50 and 1956-57
1947-62	Executive Committee, Council on Rheumatic Fever and Congenital Heart Disease
1949-57	Chairman, Committee on Criteria and Standards for Programs of Care, American Council on Rheumatic Fever
1949-57	Editorial Board, Circulation
1950-65	Chairman for the United States, United Kingdom-United States Cooperative Rheumatic Fever Study
1955	Advisory Committee on Disease Control, Medical and Health Division, Massachusetts State Civil Defense Agency
1955	Chairman, Technical Advisory Committee on Foreign Quarantine, USPHS
1955-58	Editorial Board, American Review of Tuberculosis and Pulmonary Disease
1956	Chairman, Expert Committee on Rheumatic Diseases, World Health Organization, Geneva
1956	Expert Advisory Panel on Chronic Degenerative Diseases, World Health Organization, Geneva
1956	Chairman, Seminar on Epidemiology and Prevention of Rheumatic Fever, International Children's Center, Paris
1956-61	Committee on Public Health and Problems Relating to Special Diseases, Massachusetts Medical Society
1956-67	Research Advisory Council, Chairman, 1963-66; United Cerebral Palsy Foundation
1957-58	Committee on the Social Aspects of Science, American Association for the Advancement of Science
1958	Expert Committee on Cardiovascular Diseases and Hypertension, World Health Organization, Geneva
1958-59	Governor Furcolo's Ad Hoc Advisory Committee on Public Health and on the Selection of a Health Commissioner
1959-61	Neurology Field Investigations Study Section, National Institute of Neurological Diseases and Blindness, USPHS
1962-65	Human Ecology Study Section, National Institutes of Health, USPHS
1962-65	Advisory Committee, Institute of Laboratories, Massachusetts Department of Public Health
1963	Chairman, Conference on Rheumatic Fever in the Americas, Santiago, Chile, Pan American League Against Rheumatism, the Chilean Rheumatism Society, and the Pan American Health Organization
1963-69	Editorial Board, Medical Care
1964-65	Planning Committee, World Health Research Center, World Health Organization, Geneva
1964-70	Member, Corporation Visiting Committee, Medical Department, Massachusetts Institute of Technology
1965-66	Neurological and Sensory Disease Service Project Review Panel for Neurology, USPHS
1965-67	Committee on International Program, American Heart Association
1966	Chairman, Expert Committee on Prevention of Rheumatic Fever, World Health Organization, Geneva
1966	Panel, Health Sciences Advancement Award, National Institutes of Health

Past Committee Appointments

1967-73 Member, Committee on the Interplay of Engineering with Biology and Medicine, National Academy of Engineering
1968 Member, Ad Hoc Committee on the Crisis Facing American Sciences, New York Academy of Sciences
1968-73 Member, Special Medical Advisory Group, Veterans Administration
1970-73 Chairman, Subcommittee on Technology and Systems Transfer, National Academy of Engineering
1972-75 Member, Steering Committee, Pilot Study of Births in the U.S., Maternity Center Association, New York, New York
1975-76 Chairman, Merit Review Board, Health Services Research & Development Service, Veterans Administration, Washington, D.C.
1975-79 Member, Governing Board, Action Thématique Programmée - "Santé", Centre National de la Recherche Scientifique (CNRS), Paris, France
1975-76 Member, Task Force on Regionalization, American Blood Commission, Washington, D.C.
1975-76 Member, Epidemiology Work Group, National Commission on Arthritis and Related Musculoskeletal Diseases, Washington, D.C.

Present Committee Appointments

1947- Advisory Committee, Heart Disease Epidemiology Study, U.S.P.H.S., Framingham, Massachusetts
1965- Editorial Board, Methods of Information in Medicine
1975- Chairman, Working Group on Preventable and Manageable Diseases, in collaboration with the National Center for Health Statistics, the Center for Disease Control, and the Veterans Administration

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3. Rutstein, D.D. and Miller, J.K.: Virulence for Man of Pneumococcus Type III. Journal of Bacteriology, 41:627-643, May, 1941.

4. Rutstein, D.D., Reed, E.A., Langmuir, A.D. and Rogers, E.S.: Immediate Serum Reactions in Man. Archives of Internal Medicine, 68: 25-56, July, 1941.

5. Rutstein, D.D., Rogers, E.S. and McCaffrey, I.: The Significance of a History of Asthma with Reference to Serotherapy. New England Journal of Medicine, 225: 368-369, September 4, 1941.

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7. Rutstein, D.D.: Lines Along Which Public Health Procedures May Develop. Chapter XII in The Epidemiology of Rheumatic Fever and Some of Its Public Health Aspects. Paul, J.R., Editor, Second Edition, New York, Metropolitan Life Insurance Company for the American Heart Association, pp. 107-115, 1943.

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9. Rutstein, D.D.: The Role of the Cardiac Clinic in the Rheumatic Program. Journal of the American Medical Association, 126: 484-486, October 21, 1944.

10. Greenberg, M., Frant, S. and Rutstein, D.D.: "Gamma Globulin" and "Placental Globulin." A Comparison of Their Effectiveness in the Prevention and Modification of Measles. Journal of the American Medical Association, 126: 944-947, December 9, 1944.

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14. Rutstein, D.D., Thomson, K.J. and Tolmach, D.M.: Electrocardiographic Changes During Intravenous Therapy of Pneumonia. Bulletin of the New York Academy of Medicine, 21: 433, (Abstract), August, 1945.

15. Thomson, K.J., Rutstein, D.D., Tolmach, D.M. and Walker, W.H.: Electrocardiographic Studies During and After Pneumococcus Pneumonia. American Heart Journal, 31: 565-579, May, 1946.

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Letters to and from the Editor. The Doctor's Role. Atlantic Monthly, 198: 38, October

38. Rutstein, D.D.: How Good is Polio Vaccine? Atlantic Monthly, 199: 48-51, February, 1957.

Letters to and from the Editor. Polio Vaccine. Atlantic Monthly, 199: 32, April.

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Letters to and from the Editor. The Cold-Cure Merry-go-round. Atlantic Monthly, 200: 20-21, July.

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Letters to and from the Editor. The Flu Epidemic. Harper's Magazine, 215: 10 and 12, October

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The Crisis in American Medicine. (As Harper's Readers See It: A Round-up of Comments). Harper's Magazine, 222: 78, 81-82, January, 1961

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Letters to and from the Editor. The Medical Care Pork Barrel. Atlantic Monthly, 207: 31-33, June, 1961.

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